

ASSESSMENT OF ROLES OF COMMUNITY PHARMACISTS IN MANAGEMENT OF DIABETES MELLITUS IN RIVERS STATE, NIGERIA

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Article Received on
10 Jan. 2018,

Revised on 01 Feb. 2018,
Accepted on 22 Feb. 2018

DOI: 10.20959/wjpr20185-11112

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ABSTRACT

Diabetes mellitus (DM) is a metabolic disorder of carbohydrate, fat and protein, characterized by hyperglycemia resulting from defective insulin secretion, insulin action or both. DM is one of the major chronic diseases which affect millions of people worldwide. The burden of DM is attributable to its complications which may be acute or chronic and can result from poor management of the disease. Community pharmacists are easily accessible, and well positioned to render healthcare services. This study aimed to assess the role of community pharmacists in management of DM. A cross sectional study was carried out using pre-tested structured questionnaire among community pharmacists in Rivers State. A total of 200 pharmacists

were systematically selected from the 20 zones of pharmacies. 190 Pharmacists responded. Of the respondents 127 (66.8%) were male; 48(25.3%) aged 20–29yrs, and 66(34.7%) aged 40yrs and above. 129(67.9%) had over 10yrs practice experience while 134(70.5%) had completed at least 10 modules of Pharmacists Council of Nigeria (PCN) mandatory continuing professional development education program. 98.9% (188) of respondents provide diabetes services. The services provided ranked in order of frequency of provision as: medication refill > counseling > monitoring > education > assessment > documentation. For each group of diabetes services provided the least frequent is as: counseling: care of foot/skin 35(18.4%); education: preventive measures 90(47.4%); monitoring: glycosylated hemoglobin (HbA1C) 38(20%); assessment: referral 23(12.1%). Only 78(41%) respondents document patients' progress report data. More male pharmacists provide diabetes services than female ($p < 0.05$), as respondents aged 30–40yrs provide diabetes services most

frequently compared to age 20–29yrs and ≥ 40 yrs ($p < 0.05$). Pharmacists with more than 10yrs practice experience 129(67.9%) more frequently provide counseling, monitoring, and education than those with less practice experience ($p < 0.05$). There were no significant difference between the diabetes services provided and respondents' educational status, and completion of 10 modules of PCN mandatory continuing professional development education program. Community pharmacists in Rivers State provide a range of diabetes services at various capacities and levels.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder of carbohydrate, fat and protein, characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. Deficiency in insulin action results from inadequate insulin secretion and /or diminished tissue response to insulin at one or more points on the complex pathway of the hormone action. Insulin, a hormone produced by the pancreas, controls the blood glucose by regulating the production and storage of glucose. In diabetes there may be a decrease in the insulin produced by the pancreas which leads to abnormalities in the metabolism of carbohydrates, proteins, and fat.^[1]

Diabetes is one of the major chronic diseases which affect millions of people worldwide. The burden of DM is attributable to its complications which maybe acute or chronic. Hyperglycemic emergencies remain a major cause of concern in Nigerians with diabetes mellitus accounting for 40% of all DM admissions with documented determinant of fatal outcomes being diabetic foot ulcer, hypokalemia, and sepsis.^[2,3] Of all DM admissions hyperglycemic emergencies are listed as one of the three complication of DM associated with high fatality rates.^[4] Foot ulceration is reported to occur in 25% of all new cases of DM^[5] associated with an in-hospital mortality rate of 43%.^[6] A major risk factor for DM foot ulcer is neuropathy, and this is eminently preventable. In terms of treating the diabetic foot, not much progress has been made but preventive strategies with a focus on patient education have greatly improved.^[6]

Diabetic nephropathy is assuming an increasing role as a chronic kidney disease (CKD) in Nigeria and it is one of the leading causes of CKD in patients starting renal replacement therapy. Diabetes mellitus nephropathy is associated with increased cardiovascular risk. Cardiovascular complications of DM such as stroke and peripheral disease have been reported in 11%^[7] and 37%^[8] of persons with DM respectively in hospital settings in Nigeria.

DM has also been noted to account for 2.1% of cases of heart failure.^[9] Conventional cardiovascular risk factors such as hypertension and dyslipidemia are now routinely screened for, in persons with DM and the use of statins and antiplatelet drugs are on the increase more than ever before in DM clinics.

Diabetic retinopathy is a leading cause of blindness in people with DM and account for 16.2%-42.1% of retinal diseases.^[10, 11]

Erectal dysfunction is a prominent clinical feature of hypogonadism and usually associated with low testosterone levels. A third of all males with DM present with testicular deficiency syndrome but less than half of these discuss this problem with their caregivers (Ogbera et al, 2011).

The main goal of DM management is to restore carbohydrate metabolism to a normal state as far as possible. To achieve this goal, individuals with absolute insulin deficiency require insulin replacement therapy which is given through insulin injections or insulin pump. Insulin resistance, in contrast can be corrected by dietary modifications and exercise. Other goals of diabetes management are to prevent or treat the many complications that can result from the disease itself or from its treatment.

Pharmacists are integral member of a healthcare team and assume varied functional roles in addition to their standard medicine procurement and supply. Community pharmacists are easily accessible and uniquely positioned to offer health services that can impact positively to healthcare need of the community. The roles of Pharmacists in achieving these measures in preventing/prolonging the occurrence of DM and/ or development of DM complications and management include patient identification, patient assessment, patient referral and patient monitoring.^[13] The first thing is to identify patients with DM. These may include those who already know that Pharmacists wish to render pharmaceutical care and those who have not been previously diagnosed.^[14] This can be achieved through analyzing prescriptions and diabetic care product sales for patients with diabetes. Pharmacists can also identify individuals with high risk of developing type 2 diabetes mellitus and target them for education and counseling. Pharmacists can assess patients through a systematic process of acquiring, analyzing, and interpreting subjective and objective patient information to identify, resolve and prevent drug-related and disease-related problems. Following the assessment by

the pharmacist, the patient may be referred to the appropriate health care professionals such as the dietician, dentist, ophthalmologist, or podiatrist for further investigation.

In monitoring diabetic patient, the pharmacist reviews the drug regimen, identifies therapy problems, ascertains adherence, and also provides patient focused intervention. The involvement of pharmacist in diabetes management should result to positive outcomes which include clinical, humanistic and economic outcomes.^[13]

The Canadian Pharmacists Association (2005) in their study on the roles of community pharmacists in the management of diabetic patients, identified six[6] general roles community pharmacists are involved which include: providing information to patient about glucose monitoring, modifiable lifestyle, and medication refill.^[15] Some study carried out on the role of community pharmacists in diabetes management, reported that while hospital pharmacists were not directly involved in diabetes patient-care clinics, their main role is procurement and storage of antidiabetic drugs. Meanwhile, community pharmacists (88%) were involved in patient counseling on the storage and use of medicines.^[16] Some other works identified community pharmacists' role to center on diabetes education, counseling on the use of drugs and monitoring instruments, monitoring of diabetic patients^[17, 18] and pharmaceutical care intervention.^[19] Meanwhile, Wilbur et al; (2014) identified that Pharmacists in Qatar face several barriers in guiding patient self-management of diabetes during Ramadan, and identified some of the barriers to include lack of private counseling areas.^[20] However, the Pharmacists expressed positive attitude consistent with a desire to assume greater roles in advising fasting diabetic patients. Very limited study has been done on the role of community pharmacists in the management of diabetic patients in Nigeria. This study, therefore aimed to identify the role community pharmacists play in the management of diabetic patients in a typical Nigerian city and any possible factor that influence their involvement.

METHOD

The study area for this work is Port Harcourt metropolis, capital of Rivers State, located in the South-South zone of Nigeria. There are two local governments within the study area, Obio-Akpor and Port Harcourt city. A total of 364 registered community Pharmacies were located within the study area.^[21]

Sample size was determined using Lesliel's equation for sample size determination^[22]

$$n = z^2 pq/d^2 \quad \text{-----Eq. (1)}$$

n = desired sample size in population > 10, 000 z = standard deviation corresponding to 95% confidence level (1.96)

particular characteristic (0.5) p = proportion of target population estimated to have

d = degree of accuracy set at 0.05% $q = 1-p$

$$n = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 384.16$$

$$n_1 = n / (1 + n/N)$$

Where n_1 = population < 10,000.

Substituting the values into Eq.(1): $n_1 = 384 / 1 + (384/364) = 384/2.055 = 187$.

To accommodate for any loss a total of 200 pharmacists who owned pharmacies were targeted. The study was a cross sectional study conducted between November 2015 and February 2016. In Port Harcourt pharmacies are grouped into zones based on location and there are a total of 20 zones. Each zone has 15 to 30 pharmacies located therein. From each zone, systematic sampling was used to select 10 pharmacies given a total of 200 pharmacies.

Data were collected using pre-tested structured questionnaires. The target population was the superintendant Pharmacist in each of the Pharmacy selected. Two hundred questionnaires were distributed. The questionnaire was structured into 3 parts: demographic data; services rendered to diabetic patients; and barriers/challenges to services rendered to diabetic patients. Services to diabetic patients were categorized under (1) medication refill; (2) education and counseling of patient, (3) assessment, monitoring (4), referral and (5) documentation of patient's progress report. Data analysis was carried out using SPSS version 20. Statistical significance for all analysis was defined as $p < 0.05$, using t-test, ANOVA, and correlation. Demographic characteristics were summarized using frequency and percentages.

RESULT

Two hundred questionnaires were distributed to 200 superintendant pharmacists of the selected pharmacy and 190 retrieved, given 95% response. The demographic data of the respondents are shown in table 1. Of the 190 respondents, 127(66.8%) were male and 63(33.2%) were female. 37(19.5%) had 5years or less practice experience with 129(67.9%) having more than 10years practice experience. More respondents (40%) were within the ages of 30–39years and majority 150(79%) had Bachelor of Pharmacy degree with only 13(6.8%) having M.Sc./M.Pharm. degree. Only 8(4.2%) pharmacists had completed special diabetes continuing education program in the past, while 134(70.5%) had completed 10 modules of PCN mandatory continuing professional development education (MCPDE) program.

Table 1: Demographic data of the Respondents.

(N= 190)

Variable	Frequency	Percentage
Gender		
Male	127	66.8%
Female	63	33.2%
Age		
20–29years	48	25.3%
30–39years	76	40%
≥40years	66	34.7%
Educational Status		
B.Pharm.	150	79%
Pharm D.	27	14.2%
M.Pharm/M.Sc.	13	6.8%
Years of Practice (experience)		
≤ 5years	37	19.5%
6–10years	24	12.6%
>10yrs	129	67.9%
Have you ever completed special diabetes continuing education program in the past		
Yes	8	4.2%
No	182	95.8%
Have you completed at least 10 modules of PCN ¹ mandatory continuing professional development education (MCPDE)		
Yes	134	70.5%
No	56	29.5%

PCN¹ = Pharmacists Council of Nigeria.**Table 2: Proportion of Community Pharmacist that manage diabetic patients**

	Frequency	percentage
Yes	188	98.9%
No	2	1.1%

The proportion of community pharmacists who manage diabetic patients is shown in Table 2.

Almost all the pharmacists manage diabetic patients in various capacities and levels.

Table 3: Services provided by Community Pharmacists to diabetic patient.

(N= 190) (n%)

Service provided	Frequency (n%)			
	Not at all	Rarely	Always	Median (IQR)
Medication refill	0	2 (1.1)	188 (98.9)	3(1–3)
Overall Median				3(1–3)
Education on	Not at all	Rarely	Always	Median (IQR)
signs/symptoms of DM	12(6.3)	48(25.3)	130(68.4)	3(1–3)
risk factors	43(22.6)	45(23.7)	102(53.7)	3(1–3)
Lifestyle modification	21(11)	63(33.2)	106(55.8)	3(1–3)
Complications of DM	28(14.7)	58(30.1)	104(54.7)	2(1–3)
preventive measures	37(9.4)	63(33.2)	90(47.4)	2(1–3)
Overall median			3(1–3)	
Counseling on				
Dosage and dosage regimen	10(5.3)	8(4.2)	172(90.5)	3(1–3)
Insulin administration	33(17.3)	82(43.2)	75(39.5)	2(2–3)
Management of hypoglycemia	86(45.3)	79(41.6)	25(13.1)	2(1–3)
Appropriate storage of insulin	11(5.8)	22(11.6)	157(82.6)	3(1–3)
Care of the skin/foot	38(2)	117(61.6)	35(18.4)	2(1–3)
Adverse drug interaction	15(7.9)	108(56.8)	67(35.3)	2(1–3)
Overall Median			2(1–3)	
Monitoring for progression/complications				
Blood glucose level	18(9.5)	12(6.3)	160(84.2)	3(1–3)
Body mass index (BMI)	41(21.6)	20(10.5)	129(67.9)	3(1–3)
Blood pressure	10(5.2)	14(7.4)	166(87.4)	3(1–3)
Lipid profile	84(44.2)	30(15.9)	76(40)	2(1–3)
Glycosylated hemoglobin	140(73.7)	12(6.3)	38(20)	1(1–3)
Over all Median				3(1–3)
Assessment for DM and Referral	Not at all	Rarely	Always	Median (IQR)
diabetes mellitus screening of population	12(6.3)	49(25.8)	129(67.9)	3(1–3)
Referral to physicians/specialists (ophthalmologist, dentists)	64(33.7)	103(54.2)	23(12.1)	2(1–3)
Documentation of patient's progress data	45(23.7)	67(35.3)	78(41)	2(1–3)

The various diabetes services and frequency of providing these services to patients is shown in Table3. The overall medians (IQR) for each group of diabetes services were: medication refill 3(1-3); education on diabetes related issues 3(1–3); counseling patients on diabetes issues 2(1-3); monitoring diabetic patients 3(1-3); assessment and referral 3(1-3) and 2(1–3) respectively, while documentation of patient's progress data is 2(1-3).

All the respondents were involved in diabetes medication refill. One hundred and thirty (68.4%) respondents educate patients on signs and symptoms of diabetes; 102(53.7%) educate patients on risk factors; 106 (55.8%) on life style modification; 104 (54.7%) on complications of diabetes; and only 90(47.4%) on preventive measures against diabetes. Over

90% (172) counsel patient on dosage and dosage regimen; 157(82.6%) on appropriate storage of insulin; but few 75(39.5%), and 35(18.4%) counsel patients on insulin administration and adverse drug interaction respectively. Most (160;(84.2%) pharmacists monitor blood glucose level of the patients; 129 (67.9%) monitor BMI; 166(87.4%) monitor blood pressure of diabetic patients, but only 38(20%) monitor glycosylated hemoglobin (HbA1C) as 76(40%) monitor lipid profile of patients. Although 129(67.9%) of community pharmacists screen patients for diabetes, only 23 (12.1%) refer patients to physicians or other specialists. Documentation of patients' progress report was rarely carried out by 67(35.3%) of respondents, while a good number 45(23.7%) do not document the data at all.

Fig 1 shows the various diabetes services provided by the community pharmacists ranked in order of frequency of provision. The services are ranked as follows: Medication refill > Counseling > Monitoring > Education > Assessment > Documentation.

Medication refill ranked highest as the service provided by the community pharmacist while documentation of patients' data is the least of all the services provided.

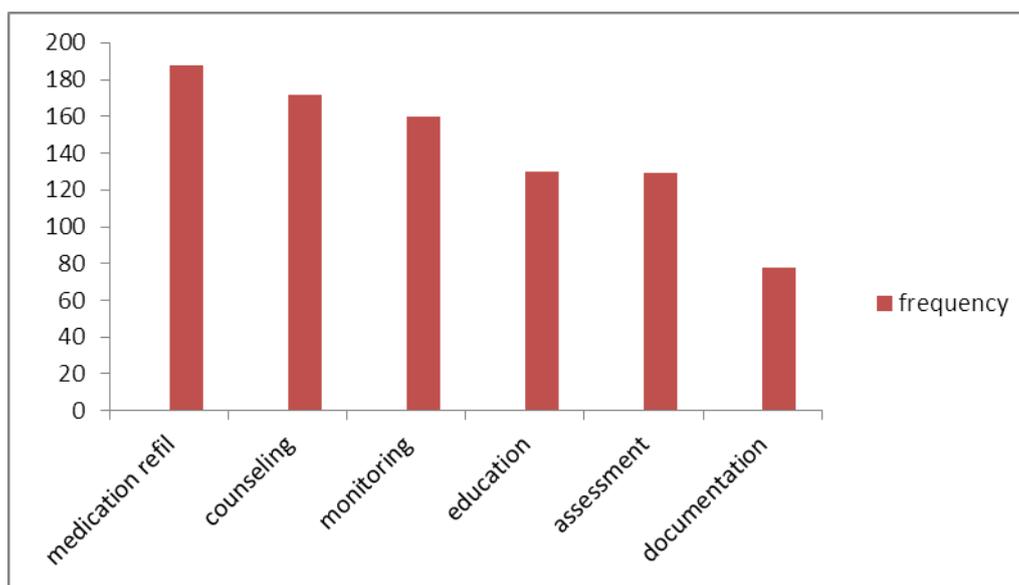


Fig 1: Diabetes services provided by the pharmacists ranked in order of provision.

Respondents aged 30-39yrs (76; 40%), provided medication refill, monitoring, education, counseling, assessment & referral, and documentation, most frequently when compared to respondents age 20 -29yr and those aged 40yrs and above ($p < 0.05$). Glycosylated hemoglobin $p < (0.05)$ is the least of the monitoring services provided among this group, with adverse drug interaction being the least counseling information given to patients ($p < 0.002$).

Male pharmacists (127; 66.8%) provided diabetes services more than the female pharmacists ($p < 0.05$), but more female than male provided documentation services for diabetic patients ($p < 0.003$). Pharmacists within than 10yrs practice experience (129; 67.9%) more frequently provided medication refill, education, and monitoring than those with less practice experience ($p < 0.001$). There were no significant differences between the diabetic services provided to patients and respondents' educational status; completion of 10 modules of PCN mandatory continuing professional development education (MCPDE), and completion of special diabetes continuing education programme ($p > 0.05$).

DISCUSSION

The pharmacist is an integral member of healthcare team and assumes varied functional roles from procurement and supply of medicines to pharmaceutical care services. Involvement of pharmacists in patient care has reduced the number of hospital admissions and patients visit for medical emergencies. Dr Hans V. Hogerzeil, WHO Director of Medicine Policy and Standard, once said, "Pharmacists have an important role to play in healthcare which is much more than selling medicines."^[23,24]

The finding of this study showed that community pharmacists in Rivers State provide essential roles in the management of diabetes in patients. The various services provided ranked in order of provision as: medication refill > counseling > monitoring > education > assessment > documentation. Cambell (2002) identified the role of pharmacists in diabetes management to include patient identification, assessment, education, referral, and monitoring.^[13] Pharmacists can help identify patients with diabetes through screening and should target patients at high risk including people with family history of the disease and women with a history of gestational diabetes. In a similar study, the Canadian Pharmacists Association (2005) in a work on roles of community pharmacists on the management of diabetic patients, identified six general roles community pharmacists are involved which include patient education about the drugs, providing information to patients about glucose monitoring and modifiable life style, and medication refill services.^[15] Pharmacists' interventions to improve the care of patients with diabetes have shown to deliver positive clinical^[25,26], humanistic^[24,27,28] and economic^[29] benefits. Management of every patient should commence with a detailed assessment at the initial diagnosis including an appraisal of diabetes complications and risk factors for developing complications. This provides the

basis for continuing care that includes a treatment plan, treatment administration, monitoring and review.^[30, 31, 32, 33, 34]

In this study, medication refill service was identified to rank highest among the diabetes services provided. This is consistent with previous study^[17] which reported that the role of pharmacists in diabetes care was mainly viewed as supply and dispensing of medications. However, evidence supports pharmacists' extending role in diabetes care from medication supply to cognitive services which aim to assist those with diabetes achieve the best possible clinical outcomes through supporting their self-management. However, the interventions which are often multifaceted have varied across studies, although, they are often education and clinical review-based, making it difficult to determine which element delivers the greatest benefit. In a review article on role of pharmacists in management of type 2 diabetes^[35], the authors pointed out that pharmacists potentially have a role to play in all facets of the care of Type 2 diabetes patients. However, the wide spread implementation of such services will depend on legislative change, adequate funding, professional commitment, inter-professional collaboration, and consumer (patient) acceptance. The patient acceptance concern was illustrated in the study^[36] in which consumers expressed consistent concern about the knowledge and competency of pharmacists to provide these additional services, but were happy to accept that pharmacists can provide them with medication and counseling. Their work was supported by the finding of a similar work^[37] in which participants in the study highlighted the main role of pharmacists to be medication provision, with some enhancement in supporting adherence and continuity of supply. Thus, in our study, the reasons given by respondents for not offering these services include: lack of facilities, 58.9%; lack of cooperation 24.1%; lack of time 11.3%; and safety concerns 5.7%. It was suggested that for community pharmacy based services for diabetes care to succeed, these patient perception must be changed; this will require action from within the pharmacy profession through further training, establishment of private consulting areas, changes in work flows, and proactively promoting pharmacists capability to deliver.^[35]

The glycosylated hemoglobin (HbA1C) is a measure of the average plasma glucose concentration over a period of 3 months. An HbA1C value below 6mmoles/L minimizes the risk of developing diabetes complications. Evidence suggests that patients with HbA1C > 9mmoles/L gain the greatest benefit of pharmacists' interventions, suggesting that targeting such patients would be appropriate.^[38] Meanwhile in our study only 38(20.3%) of

respondents monitor HbA1C of diabetic patients, thus highlighting the need for improvement in this aspect of diabetes service.

Again documentation of patient's progress report is an essential aspect of pharmaceutical care provision. It enables the pharmacist to develop a patient's database, patient's follow up, and referral as need arises, yet in our study, 45(23.7%) of respondents do not carry out documentation services at all. Hence, there is need to improve on these services: HbA1C monitoring; documentation and referral to achieve the best patient therapeutic outcome.

Furthermore the result of this study showed that there is no significant ($p>0.05$) differences in diabetes services provided and respondents' educational status and completion of at least 10 modules of PCN mandatory continuing professional development education (MCPDE) program. This may be possibly attributed to similarity in the content of the curricula and the re-training benefit of the programs.

CONCLUSION

This study identified that community pharmacists in Rivers State provide diabetes services to diabetic patients in various capacities and levels. However, there is need to improve diabetes services in areas of monitoring HbA1C; documentation; and referral. This study further supports an earlier work which concluded that community pharmacists are in a unique position to monitor and counsel rural patients with DM.^[39] The need for increased diabetes care presents an excellent opportunity for community pharmacists to become more involved in the management and follow up of people with DM. Their study demonstrated the positive impact that the community pharmacist can have in achieving the primary therapeutic goal in diabetic patients for overall diabetes control.

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