

KNOWLEDGE OF DIABETIC RETINOPATHY AMONGST PHARMACISTS IN A NIGERIAN TERTIARY HEALTH FACILITY

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Abstract

Introduction: Diabetic retinopathy (DR), also called Diabetic Eye Disease (DED), is one of the most common complications of diabetes and a primary cause of vision loss in middle-aged and elderly adults. Anti-vascular endothelial Growth Hormone (Anti-VEGF) medication is appropriate for diabetic macular oedema with vision loss. However, laser photocoagulation avoids severe vision loss in eyes with proliferative DR. These efforts together with increased public knowledge and access to frequent DR screening with retinal imaging, as well as pharmacists' active participation in patient counselling and drug therapy monitoring in early disease states, will lead to better outcomes and avert blindness in DR patients.

Objectives: This study set out to evaluate pharmacists' knowledge of DR, as well as their ability to identify patients at risk of developing DR.

Methods: A cross-sectional study that enrolled 30 Pharmacists working at the Federal Medical Centre, Makurdi, Benue State, Nigeria. Structured questionnaires were used to obtain data which covered a period of two months from July to August 2023. Data was analysed using simple percentages and charts. Chi-square was used to test the relationship between variables at a 5% confidence interval. ($p=0.05$). Good knowledge was set at the 75th percentile (Q3) or more.

Results: According to the findings, 16 out of 30 participants had knowledge scores below 75 per cent implying poor knowledge of DR.

Conclusion: A team approach to patient management is the most effective form of health care delivery. It would be extremely beneficial for Pharmacists as professionals to upgrade their knowledge of this chronic diabetic complication to provide managed care with an emphasis on lowering problems related to diabetes pharmacotherapy and improving the lives of the people.

Keywords: Pharmacists, Knowledge, Diabetic Retinopathy, Clinical Setting, Nigeria.

Introduction

Diabetic Retinopathy (DR) is a microvascular disorder occurring due to the long-term effects of diabetes mellitus ^[1]. It is a highly specific neurovascular complication of both type 1 and type 2 diabetes; the prevalence of which strongly correlates to both the duration of diabetes and level of glycaemic control. A pooled meta-analysis involving 35 studies conducted worldwide from 1980 to 2008 estimated the global prevalence of diabetic retinopathy and proliferative diabetic retinopathy (PDR) among patients to be 35.4% and 7.5%, respectively ^[2]. In a Nigeria study, over 10% of people with diabetes aged 40 years and above had sight-threatening diabetic retinopathy ^[3].

Diabetic retinopathy is the most common cause of new cases of blindness among people of working age ^[4] in developed countries and has social consequences beyond sight loss. Factors that increase the risk of or are associated with diabetic retinopathy include length of diabetes, chronic hyperglycaemia ^[5-6], hypertension ^[7], and dyslipidaemia ^[8]. Lowering blood pressure has been shown to decrease retinopathy progression in people with type 2 diabetes, although tight targets (systolic blood pressure 120 mmHg) do not impart additional benefit over targets of 140 mmHg ^[9]. In patients with

dyslipidaemia, retinopathy progression may be slowed by the addition of fenofibrate, particularly with very mild non-proliferative diabetic retinopathy (NPDR) at baseline ^[8].

Intravitreal administration of anti-VEGF agents is currently the mainstay of therapy for both early and advanced stages of DR. While conventional laser therapy only provides stabilization of visual acuity, anti-VEGF therapy can result in visual improvement with fewer ocular adverse effects.

The prevention of diabetic retinopathy-related blindness is largely dependent on early identification and prompt intervention ^[10]. WHO Global Report on Diabetes ^[11] and the World Report on Vision ^[12], have stated the benefit of Diabetic Retinopathy (DR) screening as a means of preventing blindness and vision impairment. Effective screening and a comprehensive dilated eye examination, at minimum, annually will help identify patients who need a referral to a specialist, thereby preventing blindness and visual impairment ^[13]. Prevention can be achieved via early detection and control of risk factors, regular screening and adequate glycaemic control, and prevention or adequate management of comorbidities. Based on these, Pharmacists have an active role to play in the prevention and treatment of DR by taking medical records, screening, patient education on medication adherence, drug therapy monitoring, identification, prevention and resolution of Drug Therapy Problems (DTP), and follow up as well as lifestyle modification and dieting, as these will help to prevent DR in diabetic patients and as well improve their treatment outcomes. A study of Pharmacist-managed cardiovascular risk reduction effect on diabetic retinopathy demonstrated Pharmacists' potential role in diabetes collaborative care with a resultant reduction in the progression of diabetic retinopathy ^[14].

Pharmacists are in a unique position to identify DR screening candidates based on their medication histories and can utilize the screening as a vehicle for promoting patients to seek DR care from their Physicians ^[15]. Thorough knowledge of DR and its risk factors by Pharmacists is very important to effectively perform these responsibilities.

Statement of the problem

Owing to the increased incidence of Diabetic Retinopathy and its complications especially in patients with prolonged diabetic mellitus, resulting from lack of systematic screening and lack of patient education on medication adherence, monitoring as well as proper information on lifestyle modification and dieting, opportunities to prevent people from developing vision impairment and blindness are missing. Over the years, studies have revealed that the increased burden is due to poor and inadequate management of patients, hence there is a need for clinicians, especially the pharmacist as the authorities in Drug Therapy Monitoring (DTM), to proffer effective solutions. Pharmacists working in Collaborative Drug Therapy Management (CDTM), using a collaborative practice agreement with Physicians, will help improve patients' therapeutic outcomes. There is documented evidence that Pharmacist-managed care possesses the potential to prevent patients from developing DR ^[14]. There is, however, a paucity of data regarding the knowledge of diabetic retinopathy and its risk factors among Pharmacists and their willingness to make appropriate referrals for those at risk of DR. This study seeks to bridge this gap.

Objectives of the Study

The broad objective of this study is to assess the knowledge of diabetic retinopathy and its risk factors among Pharmacists. Specifically, the study seeks to ascertain the capacity of Pharmacists to identify patients at risk of developing diabetic retinopathy, their real-life experience with diabetic retinopathy patients, their participation in the management of DR and their willingness to refer patients at risk of DR for specialized care while testing the relationship between knowledge, real-life experience and demographic variables.

Methods

Study location and setting

The study was carried out at the Federal Medical Centre, Makurdi, Benue State, a tertiary hospital located in North Central, Nigeria that serves as a referral centre but also provides both secondary and primary care. It is a tertiary hospital with more than 400 beds.

Study Design

A cross-sectional study that assessed the knowledge of Diabetic Retinopathy among pharmacists in a clinical setting. The study relied mainly on information obtained from the participants using a structured questionnaire. The research participants included pharmacists working in the various sections of the hospital who had worked in the hospital for not less than one year and who consented to participate in the study.

Sample Size Determination/Sampling Technique

The sample size for the study was calculated using Taro Yamane's formula as in Abatur et al 2023 [16]. A total of 39 participants were to be enrolled but only 33 participants filled in the questionnaires. However, 3 questionnaires had incomplete data therefore only 30 were analysed. Convenience sampling which recruits participants who are accessible from the study population was used.

Data Collection Tool/Procedure

Data was collected using a structured questionnaire consisting of five sections. Section one consisted of socio-demographic data such as age, sex marital status, and qualifications. Pharmacists' knowledge of diabetic retinopathy, participation in DR management, Pharmacists' role and willingness to refer were assessed in the subsequent sections. The questionnaires were administered to Resident pharmacists who were at their duty post within the period of study. Data was collected in the months of July and August 2023.

Data Analysis

Data collected were entered into Microsoft Excel, rechecked for accuracy and loaded into the latest version (4.3.2) of the R domain-specific statistical programming language software for analysis. Simple percentages and charts were used for quantitative measurement, while Chi-test was employed for testing the relationship between knowledge, and real-life and demographic variables.

Results

Table 1 shows pharmacists' level of knowledge of diabetic retinopathy. The level of knowledge was classified as "Good" if and only if the participant under study scored up to the 75th percentile (Q3) or more. As shown, 16 out of 30 participants had knowledge scores below 75 per cent. Although female participants were more likely to have good knowledge of diabetic retinopathy (71.4%) compared to males (60.9%), the difference was not found to be statistically significant ($p > 0.204$). There was no association found between participants' level of knowledge across different age groups ($p > 0.317$), however, participants aged 21 to 30 years had average scores of 75% implying good knowledge. The study also recorded no significant relationship between the level of knowledge and marital status as well as length of practice ($p > 0.818$; 0.673).

Table 2 shows the summary statistics of the study participants based on their real-life experience with patients diagnosed with diabetic retinopathy. From the results presented, 83.3% of the study participants reported having had real-life experience with patients diagnosed with diabetic retinopathy. As observed, there was not much difference in the percentage of participants' real-life experience with patients having diabetic retinopathy among males (87.0%) and females (71.4%). Based on age, the proportion of participants with real-life experience with diabetic patients having retinopathy increased with age with the majority of participants falling between the ages of 31 years and 40 years old (87.5%). However, age was not found to have a statistically significant association with participants' real-life experience with patients having diabetic retinopathy ($p > 0.218$). Similarly, the proportion of participants' real-life experience with patients who have diabetic retinopathy was higher among married participants (91.3%) than single participants (57.1%), but the difference was not statistically significant ($p = 0.068$). Participants with 5 years of experience or less had the least number of real-life experiences (66.7%).

As shown, 63% of participants reported that they had participated in the prevention and management of patients with diabetic retinopathy (Figure 1). In Figure 2, all participants (100%) strongly felt that there was a need for counselling and monitoring of patients with diabetic retinopathy and it was their

role, as Pharmacists, to do that. Many participants (96.7%) reported their willingness to refer patients for experts' management and care. See Figure 3

Table 1: Level of knowledge (%)

Variables (n = 30)	Values	Frequency	Estimate (95% CI)	Poor	Good	P-Value
Gender						0.204*
	Female	7	23.3 (10.6, 42.7)	28.6 (n = 2)	71.4 (n = 5)	
	Male	23	76.6 (57.3, 89.4)	60.9 (n = 14)	39.1 (n = 9)	
Age Group						0.317‡
	21-30y	4	13.3 (4.4, 31.6)	25.0 (n = 1)	75.0 (n = 3)	
	31-40y	16	53.3 (34.6, 71.2)	68.8 (n = 11)	31.3 (n = 5)	
	41-50y	5	16.7 (6.3, 35.5)	40.0 (n = 2)	60.0 (n = 3)	
	51-60y	5	16.7 (6.3, 35.5)	40.0 (n = 2)	60.0 (n = 3)	
Marital Status						0.818‡
	Single	7	23.3 (10.6, 42.7)	57.1 (n = 4)	42.9 (n = 3)	
	Married	23	76.6 (57.3, 89.4)	52.2 (n = 12)	47.8 (n = 11)	
Years of practice						0.673‡
	1-5y	6	20.0 (8.4, 39.1)	33.3 (n = 2)	66.7 (n = 4)	
	6-10y	8	26.7 (13.0, 46.2)	62.5 (n = 5)	37.5 (n = 3)	
	11-15y	8	26.7 (13.0, 46.2)	62.5 (n = 5)	37.5 (n = 3)	
	16-20	8	26.7 (13.0, 46.2)	50.0 (n = 4)	50.0 (n = 4)	
Real-Life Experience						
	Yes	25	83.3 (64.4, 93.7)			
	No	5	16.7 (6.3, 35.5)			

* => Fisher's exact test

‡ => Pearson Chi-Square test

Table 2: Real life experiences

Variables (n = 30)	Values	Frequency	Estimate (95% CI)	No	Yes	P-Value
Gender						0.565*
	Female	7	23.3 (10.6, 42.7)	28.6 (n = 2)	71.4 (n = 5)	
	Male	23	76.6 (57.3, 89.4)	13.0 (n = 3)	87.0 (n = 20)	
Age Group						0.218‡
	21-30y	4	13.3 (4.4, 31.6)	50.0 (n = 2)	50.0 (n = 2)	
	31-40y	16	53.3 (34.6, 71.2)	12.5 (n = 2)	87.5 (n = 14)	
	41-50y	5	16.7 (6.3, 35.5)	20.0 (n = 1)	80.0 (n = 4)	
	51-60y	5	16.7 (6.3, 35.5)	0.0 (n = 0)	100.0 (n = 5)	
Marital Status						0.068*
	Single	7	23.3 (10.6, 42.7)	42.9 (n = 3)	57.1 (n = 4)	
	Married	23	76.6 (57.3, 89.4)	8.7 (n = 2)	91.3 (n = 21)	
Years of practice						0.348‡
	1-5y	6	20.0 (8.4, 39.1)	33.3 (n = 2)	66.7 (n = 4)	
	6-10y	8	26.7 (13.0, 46.2)	25.0 (n = 2)	75.0 (n = 6)	
	11-15y	8	26.7 (13.0, 46.2)	0.0 (n = 0)	100.0 (n = 8)	
	16-20	8	26.7 (13.0, 46.2)	12.5 (n = 1)	87.5 (n = 7)	
Real-Life Experience						
	Yes	25	83.3 (64.4, 93.7)			
	No	5	16.7 (6.3, 35.5)			

* => Fisher's exact test

‡ => Pearson Chi-Square test

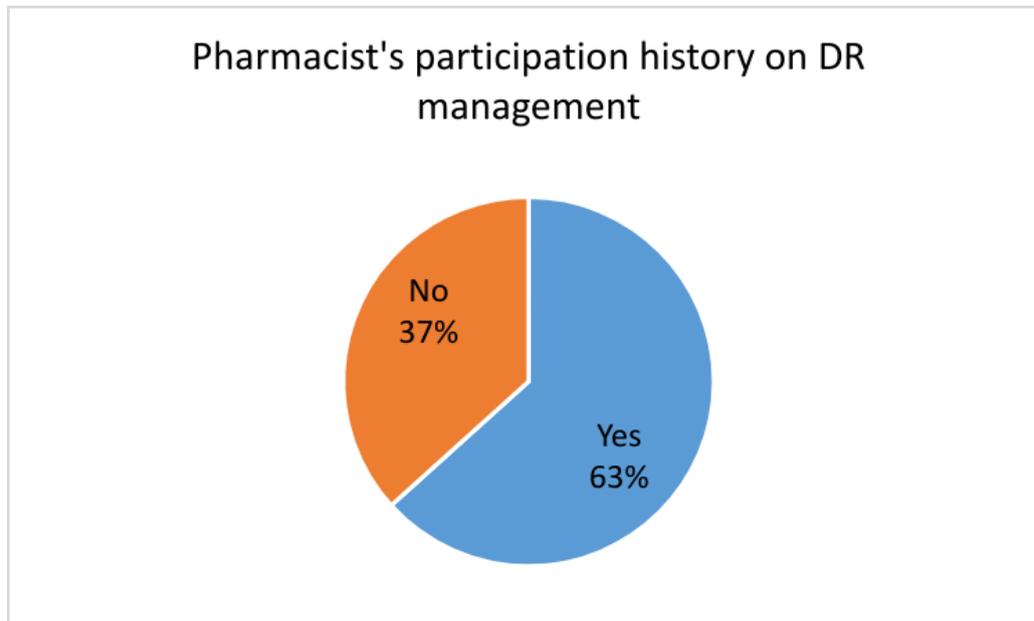


Figure 1 shows Pharmacists' participation in DR management.

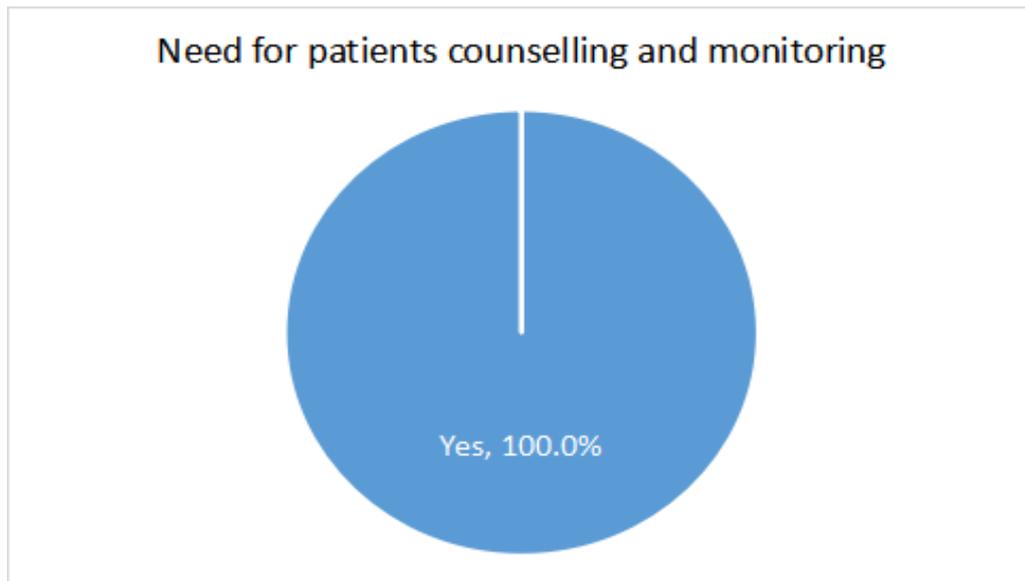


Figure 2 Showing Pharmacists' acceptance of counselling and monitoring in DR as their role and a necessity

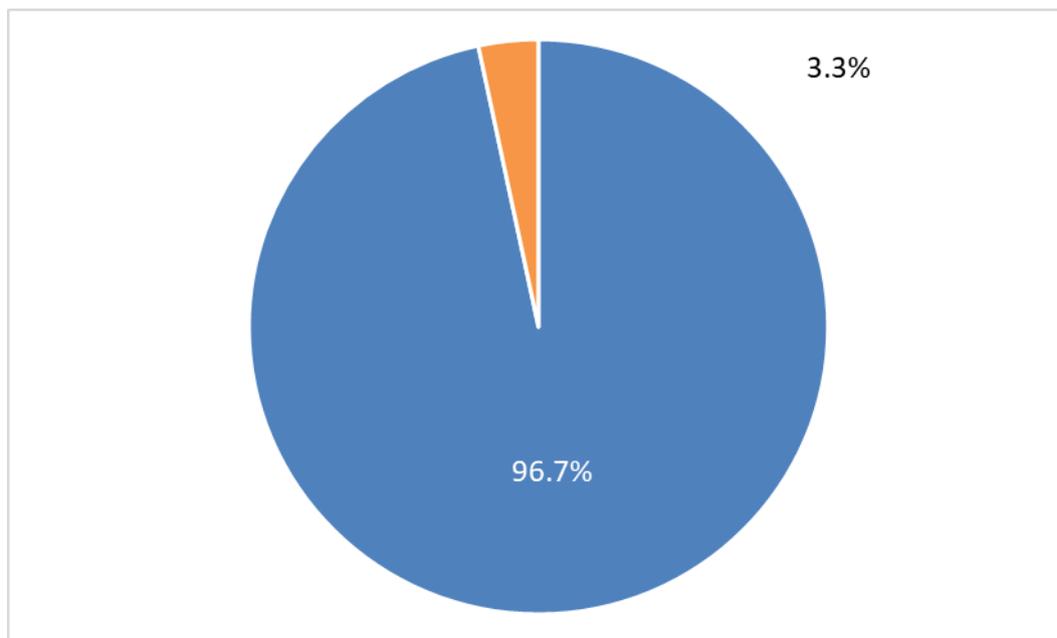


Figure 3: Pharmacists' willingness to refer DR patients for expert management

Discussion

Pharmacists are information resources in the hospital that can educate people to understand the dangers of chronic diseases and the necessity of prevention. Beyond prevention, pharmacists can use their knowledge of medicines to assist other clinicians in developing effective care plans. As part of this evaluation, Pharmacists can monitor patients' adherence to their prescribed medications to reach their therapeutic goals. This means that Pharmacists' knowledge of chronic illnesses is of utmost importance. This study was carried out to evaluate the knowledge of diabetic retinopathy (DR) among Pharmacists. For this study, scores from 75% and above were considered good knowledge while scores below 75% were poor.

There were more male participants than female with ages 31 years and above being predominant. The majority of the Pharmacists had more than 5 years of experience in the practice of the profession. A higher percentage of Pharmacists who participated in the study did not meet the 75% scores for good knowledge of diabetic retinopathy. No significant relationship between Pharmacists' knowledge of diabetic retinopathy and their socio-demographic characteristics was recorded. This means that in engaging pharmacists in DR care, their demographics may not be important parameters for consideration.

Pharmacists have been involved in several disease management programs including diabetic retinopathy. A study of Pharmacist-managed cardiovascular risk reduction effect on diabetic retinopathy demonstrated Pharmacists' potential role in diabetes collaborative care with a resultant reduction in the progression of diabetic retinopathy. The result of their study showed that exposure of Pharmacists to direct care led to significant improvement in glycaemic control compared to the control group [14]. Likewise, Caitlin et al showed that diabetic retinopathy progression remained stable in a higher proportion of patients seen by Physicians and Pharmacists than those seen by Physicians only [17].

In a study conducted by Indiana University School of Medicine; researchers found proof -of-a concept that Pharmacists' help in the management of diabetes can reduce risks of developing DR. According to researchers, long periods between patients' visits and limited meeting time with patients during those visits can hinder the educational, clinical, medication-related and psychological care patients need, but a pharmacist's involvement in medication management, patients' education and drug utilisation review has proven helpful in treating other ailments. The same can be said for retinopathy [17]. Lack of active participation of Pharmacists in the management and prevention of DR may signify dis-service to patients and under-utilization of their clinical potential.

In this study, the majority of the Pharmacists agreed to have participated in DR management. For Pharmacists to make an optimal impact in DR Prevention and management, they must improve their knowledge of the disease. Many of the participants reported having real-life experience with patients diagnosed with DR. Participants' demographic parameters were reported to have no significant relationship with participants' real-life experience.

Effective management of Type 2 diabetes (T₂DM) can reduce the risk of diabetic retinopathy. Several studies have been done extensively in developed countries to evaluate the effectiveness of Pharmacy-based interventions in supporting people with T₂DM [18-20]. Significant evidence exists to support the role of Pharmacists in providing a range of diabetes care services, from screening to disease management [20]. Pharmacists are strategically placed to assist patients with their diabetes management through medication counselling, therapeutic monitoring, the identification of drug therapy problems with appropriate interventions, identification of risk factors for DR and referral for expertise management and follow-up.

In this study, the Pharmacists agreed that patients with diabetes retinopathy need counselling and monitoring which they saw as their key roles. They must not only accept these roles but actively carry out the responsibilities. An effective referral system ensures that there is a close relationship among all levels of health care, and individuals can receive the best possible care [21]. From the current study, all the participants were willing to refer patients at risk of developing diabetic retinopathy for expert management. This attribute is symbolic of a well-functioning healthcare system.

Conclusion

Pharmacists-managed care has been shown to have the propensity to prevent diabetic patients from developing diabetic retinopathy. Pharmacists in this setting have knowledge scores below 75% which was considered the lower limit for good knowledge. It would be extremely beneficial for these professionals to upgrade their knowledge of this chronic diabetic complication to provide managed care with an emphasis on lowering problems related to diabetes and improving the lives of the people.

With Pharmacists expanding their role to include patient education about their disease conditions and medication therapy management, there is an increased opportunity for Pharmacists to have a significant effect on this important diabetes outcome. Their integration and involvement in the diabetic care team will help reduce the occurrence of diabetic complications such as diabetic retinopathy.

Limitations of the Study

The following drawbacks were noted during the conduct of the study: the hospital has Pharmacists with varying specializations on her employment (Clinical, Public, Social and administrative Pharmacists). The enrolment of Pharmacists for this study was done without consideration for their speciality areas. Research using only Clinical Pharmacists will give a better picture of the role and knowledge base of Pharmacists in managing diabetic retinopathy since management of DR is a clinical responsibility. The study was a single hospital-based study with a limited sample size; therefore, the result may not be generalised.

Ethical Issues

Being a non-invasive procedure, the researchers were verbally asked to proceed with the conduct of the research without going through the various ethical defence processes. Respondents were assured of confidentiality of information provided and names were not included in the questionnaire to further ensure confidentiality. All participants made considerable contributions to the conduct of the study and gave their consent for the copy to be published while accepting responsibility for the published work.

Recommendation

Future research that will enrol Consultant Clinical Pharmacists alone will provide a more comprehensive understanding of the role and expertise of clinical Pharmacists in the management and prevention of diabetic retinopathy since its management is a clinical responsibility.

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