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Research Article

Epidemiological Features of Diabetic Retinopathy at the Yaoundé Gyneco-Obstetric and Pediatric Hospital

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Abstract

Introduction: Diabetic Retinopathy (DR) is a retinal microangiopathy caused by chronic hyperglycemia that creates a series of histological lesions with blinding consequences. The objective of this study was to investigate the epidemiological profile of diabetic retinopathy at the Yaoundé Gyneco-Obstetric and Pediatric Hospital (HGOPY).

Methodology: A retrospective cross-sectional descriptive study was conducted in the Ophthalmology Department of HGOPY from March 1, 2024, to March 1, 2025. The study included the records of all diabetic patients aged 20 years and older, from January 1, 2013, to December 31, 2023. The variables studied were sociodemographic data, risk factors, progression factors for Diabetic Retinopathy (DR) and the correlation between DR and its risk factors. Data were entered and analyzed using R software (version 4.3.2) and Excel 2020. Chi-square and Fisher's exact tests were used, with a significance threshold of $p < 5\%$.

Results: Of the 375 diabetic patient records included in the study, 116 (30.93%) presented with Diabetic Retinopathy (DR). The male-to-female ratio was 0.68, with a higher proportion of women and the mean age was 63.66 ± 12.7 years. The main risk factors identified were poor glycemic control (n=108, 93.10%), diabetes duration exceeding 10 years (n=101, 87.06%) and hypertension (n=100, 86.20%). Patients with type 2 diabetes represented 90.52% (n=105) and those with type 1 diabetes 9.48% (n=11), with a mean diabetes duration of 17.07 ± 7.36 years. There was a statistically significant association between DR and poor glycemic control, duration of diabetes and renal failure ($P<0.001$).

Conclusion: Diabetic retinopathy remains common among diabetics; indeed, one in three diabetic patients seen had DR and more than 90% had poor glycemic control. Patient awareness and early screening would limit the occurrence of complicated, blinding stages of DR.

Keywords: Diabetes; Diabetic Retinopathy; Epidemiological Features; Risk Factor; Yaoundé; Cameroon

Introduction

Diabetic Retinopathy (DR) is a retinal microangiopathy caused by hyperglycemia that creates a series of histological lesions in small retinal vessels, leading to impaired blood flow and potentially resulting in blindness [1]. Its global prevalence is estimated at 34.6% [1]. In Western countries, the prevalence of diabetic retinopathy varies between 22% and 37% [2]. It is the fifth leading cause of blindness worldwide and the leading cause of blindness before the age of 50 in developed countries. It is responsible

for nearly 5% of all cases of blindness [1]. In Africa, it affects between 16% and 77% of diabetics and constitutes a public health problem in sub-Saharan Africa [1,3]. The prevalence ranges from 15% to 52% and it is estimated that after 15 years of diabetes, 2% of patients are blind and 10% are visually impaired [2]. The incidence and prevalence of Diabetic Retinopathy (DR) are proportional to the duration of diabetes and life expectancy. Thus, after 20 years of diabetes, 90% of people with Type 1 Diabetes (T1D) and 60% of people with Type 2 Diabetes (T2D) develop DR [4].

In Cameroon, Koki, et al., found a prevalence of 42% in 2010, with 113 men (57%) and 85 women (43%). The mean age was 58 years and the mean duration of diabetes was 12.8 years. One hundred and twenty-eight (64.6%) diabetic patients had Non-Proliferative Diabetic Retinopathy (NPDR) in both eyes, 53 (26.8%) had Proliferative Diabetic Retinopathy (PDR) in both eyes and 14 (7.1%) had discordant NPDR in one eye and PDR in the other [5]. Nanfack, et al., found an incidence of 39.9% in 2012. The mean duration of diabetes before the diagnosis of diabetic retinopathy was 8.2 years [6]. The main epidemiological data in Yaoundé concerning diabetic retinopathy come from epidemiological studies dating back more than 5 years. In order to contribute to the updating of epidemiological data for the DR in Cameroon, it seemed appropriate to determine the epidemiological profile of diabetic patients with diabetic retinopathy at the Yaoundé Gyneco-Obstetric and Pediatric Hospital (HGOPY).

Materials and Methods

We conducted a descriptive, cross-sectional study with retrospective data collection from January 1, 2023, to December 31, 2023 (ten years) in the Ophthalmology Unit of the Yaoundé Gyneco-Obstetric and Pediatric Hospital (HGOPY). All complete medical records of diabetic patients over 20 years of age with diabetic retinopathy of any stage were included. The variables studied were age, sex, occupation, medical history (general and ophthalmological), surgical history (cataract surgery), risk factors (duration of diabetes, poor glycemic control, hypertension) and progression factors (puberty, pregnancy, rapid glycemic control, renal insufficiency). After obtaining administrative authorizations and ethical clearance from HGOPY, we extracted the names of patients with DR from the consultation registers and then from the archives. We compiled the data from the patient files using a technical form that included the above items. The data were analyzed using R software, version 4.3.2 and Excel 2020. Chi-square and Fisher's exact tests were used with a significance threshold of $p < 5\%$.

Results

A total of 116 patient records (232 eyes) with diabetic retinopathy were collected, representing a diabetic retinopathy prevalence of 30.93% in the diabetic population (116/375). The mean age was 63.66 ± 11.28 years, with a range of 27.84 years. The most represented age group was 60 to 70 years (37.93%). Women were the majority, comprising 59.48% of the patients, with a sex ratio of 0.68, as shown in Table 1-3. Retirees were the most represented occupational group at 43.1%, followed by homemakers (18.1%) (Table 3).

Sex	Patients Numbers (N=116)	Percentage (%)
Male	47	40.52
Male	69	59.48
Total	116	100

Table 1: Distribution of patients by gender.

Age Groups (years)	Patients Numbers N = 116	Percentage %
[20, 30]	2	1.72
[30, 40]	3	2.59
[40, 50]	8	6.90
[50, 60]	27	23.28
[60, 70]	44	37.93
[70, 80]	26	22.41
[80, 90]	6	5.17
Total	116	100

Table 2: Distribution of patients according to age group.

Professions	Patients Number N=116	Percentage %
Merchants	13	11.12
Students	2	1.7
Civil Servants	15	12.9
Nurses	3	2.6
Housewives	21	18.1
Retirees	50	43.1
Others	12	10.3
Total	116	100

Table 3: Distribution of the population according to profession.

Refractive error (n=102, 87.93%) was the most common ophthalmological condition and 8 (6.89%) patients had undergone cataract surgery. Hypertension was the most common family history at 41.37%. Regarding the characteristics of diabetes, type 2 diabetes predominated at 90.51%. The duration of diabetes was greater than 10 years in 79 (68.10%) patients and poor glycemic control was found in 108 (68.10%) patients. The pathologies associated with diabetic retinopathy were hypertension (86.20%), dyslipidemia (18.96%) and renal failure (9.48%).

Among the 232 eyes with diabetic retinopathy, 62.06% had developed Non-Proliferative Diabetic Retinopathy (NPDR) and 37.94% had Proliferative Diabetic Retinopathy (PDR). After multivariate analysis, the risk factors associated with diabetic retinopathy were the duration of diabetes, poor glycemic control, hypertension, hyperlipidemia and renal failure (P<0.001) (Table 4).

Risk Factors	Diabetic Retinopathy N	%	P-value
Poor Glycemic Control (glycated hemoglobin %)			P<0.001
>7%	108	93.10	
<7%	8	6.9	
Duration of Diabetes (years)			
>10 years	101	87.08	P<0.001
<10 years old	15	12.92	
Arterial HT			
Yes	100	86.2	P<0.001
No	16	13.8	
Hyperlipidemia			
Yes	22	18.96	P<0.001
No	94	81.04	
Kidney Failure			
Yes	11	9.48	P<0.001
No	105	90.52	
Arterial HT: Arterial Hypertension			

Table 4: Multivariate analysis between risk factors and diabetic retinopathy.

Discussion

In our study, the most represented age group was 60 to 70 years (37.93%). This predominance of older subjects corroborates a study conducted in the Democratic Republic of Congo which showed that the frequency of diabetic retinopathy increased significantly with age [7]. The average age of the patients was close to that of Lebonzo Essende, et al. and Nanfack, et al., who reported average ages of 60 and 58.2 years, respectively [1,4]. These similarities suggest that Diabetic Retinopathy (DR) primarily affects older subjects, probably due to prolonged exposure to the metabolic disturbances of diabetes. A female predominance was also observed in Ousmane, (72%) and Oumar T, (71.2%) [4,8]. This female predominance could be explained by the fact that men generally consult less frequently than women and the Yaoundé Gyneco-Obtetric and pediatric Hospital is a healthcare facility specializing in mother and child care. The global prevalence of diabetic retinopathy ranges from 10% to 80%, while

African studies indicate a range of 15% to 52% [9]. This demonstrates the variability of this prevalence across different studies. In Europe, the prevalence of diabetic retinopathy has been estimated at 30% in France [10]. In America, it has been estimated at 33% in the USA [7]. In our series, we found a prevalence of 30.93%, which is close to the aforementioned studies [7,10]. This frequency is lower than that reported by Ousmane M, in Bamako (37%), Koki, et al., in Cameroon in 2010 (42%), Nanfack, et al., (39.9%) and Amine, et al., which was 57% [5,6,8,9]. However, the variation in these rates could be explained by risk factors for Diabetic Retinopathy (DR): hypertension, glycemic control, duration of diabetes and type of diabetes. Currently, efforts are being made by patients and healthcare professionals to improve diabetes management.

The risk factors identified in our study were: poor glycemic control, duration of diabetes and hypertension. These same risk factors have been reported in Côte d'Ivoire and Cameroon [6,11]. Factors associated with the progression of Diabetic Retinopathy (DR) include pregnancy, adolescence, renal insufficiency, puberty, diabetes management and ocular surgery. However, in our study, only renal insufficiency (9.48%) was found to have a statistically significant association with DR. According to some authors, glycemic control is assessed by blood glucose levels, as in the study by Lebonzo, et al., in which patients with retinopathy had blood glucose levels > 1.40 g/L and by Koki, with 86.96% hyperglycemia [3,5]. It is also assessed by glycated Hemoglobin (HbA1c) levels, as in the study by Nanfack, et al., which reported a mean HbA1c level of 9.7% [6]. For most authors who used glycated Hemoglobin (HbA1c) levels as a reference, poor glycemic control is synonymous with a high prevalence and severity of diabetic retinopathy. For others who used the values of recent blood glucose levels as a criterion for judging the quality of glycemic control, the results are inconsistent [9]. In our study, both parameters were analyzed, with more than half (93.10%) of the patients having HbA1c >7%. The results showed that poor glycemic control had a statistically significant impact on the development of diabetic retinopathy ($p<0.001$), thus concordant with the results of Chakib, et al., who found 79% of patients with poor blood glucose [9]. The duration of diabetes is a major risk factor in the onset and progression of diabetic retinopathy. In our study, this risk increased significantly after ten years, which corroborates the results of Aynaou, et al. in 2015, who reported an average duration of disease progression of between 10 and 15 years in affected patients [3]. Similarly, Chakib A, Oumar T, and Klein R. reported prevalences of 70% after 15 to 20 years of diabetes, 20.8% after more than 10 years and up to 90% after 20 years of disease progression, respectively [4,7,9]. This long period before the onset of lesions can be explained by the often late diagnosis of type 2 diabetes in our setting, with the disease frequently being discovered incidentally when complications arise. This situation reflects persistent shortcomings in the early detection and management of diabetes, thus promoting the silent progression of the disease to severe ocular damage. The prevalence of hypertension in our study was higher than that found by Nanfack, et al., in 2010 (60.1%) and by Ousmane, et al., in Mali (30.8%) [6,8]. This prevalence is close to that of Lebonzo E, et al., (73.3%) [2].

Several studies have investigated the association between hypertension and the risk of developing diabetic retinopathy. The majority of authors found a positive correlation between high blood pressure and the prevalence of diabetic retinopathy, as exemplified by Kouassi, et al., who demonstrated a statistically significant association between two risk factors, including hypertension (29.7%) [11]. Our study also found a statistically significant association between hypertension and the risk of developing diabetic retinopathy.

The limitation of this study lies in its retrospective nature, with some patient records missing and data incomplete.

Conclusion

Diabetic retinopathy is a common condition, affecting one in three diabetic patients seen in ophthalmology consultations. Factors associated with diabetic retinopathy include poor glycemic control, the duration of diabetes and hypertension. Renal insufficiency was the main factor in disease progression. Therefore, there is a need to raise awareness among the general population, diabetics in particular and healthcare professionals to improve the management of risk factors.

Conflict of Interest

The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Author's Contributions
All authors have contributed equally to this work and have reviewed and approved the final manuscript for publication.

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