

# Diabetes Complications and Associated Factors in Type 2 Diabetic Patients in Cotonou

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## Abstract

Long-term complications are the main sources of morbidity and mortality in diabetic patients. **Aims:** The aims of the study were to determine the rate of long-term complications in type 2 diabetic patients and to identify factors associated to these complications. **Patients and method:** Successive type 2 diabetic patients attending the diabetic center were submitted to a questionnaire and to clinical examination. Data were completed by consulting their medical reports. Chi square test was used for statistical analysis. **Results:** In 150 diabetic patients included in the study, the global rate of complications was 78.0%. Specific rate for each complication investigated was 57.7% for peripheral neuropathy, 75.0% for erectile dysfunction, 20.0% for nephropathy, 36.6% for retinopathy, 40% for macroangiopathy and 8.0% for foot ulcer. Factors significantly associated with high rate of complications were age above or equal to 50 years ( $p = 0.001$ ), the male gender ( $p = 0.000$ ), high blood pressure ( $p = 0.0001$ ), the absence of familial history of diabetes ( $p = 0.02$ ), the duration of the disease above 5 years ( $p = 0.001$ ) and high HbA1c level ( $p = 0.001$ ). **Conclusion:** This study revealed that type 2 diabetic patients followed up in the diabetic center in Cotonou showed a high rate of chronic complications which often occurred in a younger age than in developed countries. Numerous socio-demographic and biological factors were significantly associated with the high rate of complications.

## Keywords

Diabetes, Complications, Associated Factors

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## 1. Introduction

Type 2 diabetes mellitus is a growing affection with an epidemic trend that became a public health concern problem worldwide, particularly in developing countries where the estimated progression is higher than in developed countries [1]. In Benin republic, the nationwide prevalence estimated to 1.1% in 2001 grows up to 2.6% in 2008 [2] [3] confirming the worldwide epidemic trend reported by King and Rewers in 1993 and Wild in 2004 [4] [5]. The costly aspect of the affection reside in the long term complications which are also sources of over morbidity and mortality in diabetic patients. Knowledge of factors associated with these complications can help to prevent them.

## Objective

The objectives of the present study are to determine the rate of long term complications in the type 2 diabetic patients followed up in the diabetic center in Cotonou and to identify factors associated to these complications.

## 2. Patients and Method

Study population consisted in type 2 diabetic patients from 25 to 64 years old attending the diabetes center. The sampling was constituted by exhaustive sounding of successive diabetic patients received during the study period. With their own consent, patients were submitted to a questionnaire and to a clinical examination. Data were completed by consulting medical reports of patients. Data collection concerned socio-demographic characteristics of patients and long term complications. Complications investigated were:

- 1) Peripheral neuropathy, based on the presence of subjective man if estations as paresthesia, burning feet, and the abolition of bone reflexes at the clinical examination;
- 2) Erectile dysfunction;
- 3) Nephropathy, based on the presence of proteinuria in the absence of other causes of proteinuria;
- 4) Macroangiopathy, based on the presence of legs arteries disease or ischemic cardiac disease;
- 5) Retinopathy, based on the presence of specific lesions at the funduscopy;
- 6) Data on macroangiopathy were available for only 30 patients and on retinopathy for only 50 patients;
- 7) Statistical analysis was made using the Chi square test;
- 8) Research protocol was approved by the Review Board of the Institut Régional de Santé Publique.

## 3. Results

A total of 150 patients were included in this study comprising 93 women (62%) and 57 men. The mean age of patients was  $55 \pm 10$  years.

Out of these 150 patients, 117 presented at least one of the investigated complications meaning a prevalence rate of 78.0%. The specific prevalence rate of each complication is summarized in **Table 1**.

As it appears in this table, the more prevalent complication observed is neuropathy and three out of four type 2 diabetic men complained of erectile dysfunction.

Study of factors associated with chronic complications in diabetic patients is shown in **Table 2** and **Table 3**.

**Table 1.** Specific rate of complications.

Kind of complication	Effect if	Complication rate	
		N	Pourcentage
Neuropathy	150	88	57.7%
Erectile dysfunction	57	43	75.0%
Nephropathy	150	30	20%
Retinopathy	50	18	36.0%
Macroangiopathy	30	12	40%
Diabetic foot	150	12	8.0%

**Table 2.** Association with socio-demographic factors.

Factors	Complications rate		p	
	Effective	Pourcentage		
Age (year)	30 - 49 (n = 44)	23	52.3%	0.00
	≥50 (n = 106)	94	88.7%	
Sex	Men (n = 57)	50	91.2%	0.000
	Women (n = 93)	53	69.9%	
Provenance	Rural (n = 16)	13	81.3%	0.73
	Urban (n = 134)	104	77.6%	
Perception of the diabetes	Bad (n = 47)	42	89.4%	0.02
	Good (n = 103)	75	72.8%	
Perception of obesity	Bad (n = 65)	55	84.6%	0.08
	Good (n = 85)	62	72.9%	

(): Number of patients.

**Table 3.** Association with clinical and biological factors.

Factors	Complications rate		p	
	Effective	Pourcentage		
Obesity	Obese (n = 75)	60	80.0%	0.67
	Normal weight (n = 25)	19	76.0%	
Hypertension	Yes (n = 102)	92	92.2%	0.000
	No (n = 48)	25	52.1%	
Familial history of diabetes	Yes (72)	48	66.7%	0.001
	No (78)	69	88.5%	
Diabetes duration	<5 years (72)	47	65.3%	0.001
	>5 years (78)	70	89.7%	
Glycated hemoglobin	<7% (16)	2	12.5%	0.00
	>7% (37)	35	94.6%	

(): Number of patients.

As shown in **Table 2**, complication rate was significantly higher in men than in women and type 2 diabetic patients of 50 years or more old showed higher complication rate. Another factor associated with the high complication rate was the patient's own perception of the disease. The high rate of complication was also associated with hypertension, the absence of familial history of diabetes, the duration of diabetes and the high plasma level of glycated haemoglobin (**Table 3**).

#### 4. Discussion

The global complication rate of 78% revealed by this study is very high since other studies conducted in other countries of the sub-Saharan Africa region have shown lower complication rates of 58% [6] and 65% [7]. As the study population has not been randomly selected, this higher complication rate can be explained by the fact that the center where the study has been conducted is a specialized center for diabetes care and can concentrate diabetic patients with particular health problems.

Mean age of patients of  $55 \pm 10$  years observed in our study is similar to what had been reported by Belkhadir *et al.* [8] and closed to 52 years reported by Touré in Mali [9] but lower than 62 years reported in France [10], showing that in developing countries, diabetes and its complications appear in a younger age than in developed countries.

When specific complications are considered, we can notice that the rate of neuropathy observed in our study is higher than the rate of 45% reported by Ouerdane *et al.* [11] but less high than the rate of 80% observed by Fendi *et al.* [12] evaluating diabetic neuropathy by the DN4 score. Our rate of neuropathy is conform to results reported by the Diabcare Africa Study with rate of neuropathy ranging from 39.19% to 63.70% in different Africa regions [13].

Regarding nephropathy based on proteinuria, the rate of 8.9% reported by Lăcătusu *et al.* [14] is lower than what we found in our study. In a previous study a lower rate has also been reported in Cotonou [15]. Kabaj *et al.* reported a rate of 53.85% of nephropathy in type 2 diabetic patients in Maroco [16].

Investigation of retinopathy revealed a rate of 36.0% which is less high than the rate of 47.5% reported by Khadraoui *et al.* [17] in Tunisia but closed to 36.6% reported by Tchabi *et al.* [18] in the north of Benin. In the 150 patients included in our study, only 50 were investigated for retinopathy. This confirms the observation of Rosenberg *et al.* who reported in their study that only 35% of studied patients were referred for eye exam showing that screening guidelines for diabetic retinopathy are not often respected by physician [19].

In this study, high global complication rate was associated with several factors in which patients' age and the male gender can be underlined. Another factor significantly associated with the high rate of complications is the perception the patients have of the disease. Those with bad perception of the disease often considered diabetes mellitus as a traditionally induced disease and then spend a long time with traditional healers before attending hospital. This behavior can explain the high rate of complications in relation of a long period of uncontrolled disease.

Factors classically associated with high rate of complications in type2 diabetes such as patients' age, the duration of the disease, the presence of hypertension and high HbA<sub>1c</sub> level have been evidenced in our study. No association was found between complication rate and obesity.

It can be noticed that patients without familial history of diabetes presented significantly higher rate of complications suggesting that those with familial history of diabetes are more prone to better care of their condition than the others.

## 5. Conclusion

This study has shown a high prevalence of long term complications in type 2 diabetic patients attending the diabetic center. It is now well known that the good control of the disease is associated with reduced complications. As the presence of these complications is also associated with the duration of the disease, the challenge must be precocious diagnosis and tight control of diabetes.

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