



# Hygienodietetic Measures Applied by Diabetics Followed in Bouake, 2019

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**Abstract:** *Introduction:* The management of diabetes is essential as it can lead to serious complications. This management involves the use of hygienic and dietary rules which are an integral part of the treatment. The aim of this work is to improve the management of these patients by better promotion of hygienic and dietary measures. *Methods:* We conducted a cross-sectional study over a period of two months from 27 September to 30 November 2019 in the two public health structures for the care of diabetic patients in the commune of Bouaké. These structures are the University Hospital Centre and the Sokoura Maternal and Child Protection Centre. *Results:* Patients between 51 and 60 years of age represented 36.9% of the population. They were predominantly female (65.57%), had no formal education and had a monthly income in 53.3% and 58.3% of cases respectively. Almost all diabetics did not have health insurance (92.7%). They reported physical activity in 68.6% of cases. They kept the same eating habits as the other family members in 49.9% of cases. The most common equipment used for foot care was nail clippers (46.90%) and blades (39.20%). *Conclusion:* Effective management of diabetes requires the fight against poverty and illiteracy.

**Keywords:** Diabetes, Hygienic and Dietary Measures, Bouake

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## 1. Introduction

In sub-Saharan Africa, the public health priority for decades has been the control of infectious diseases and nutritional deficiencies. Thus, many programs have been developed to control the most deadly and disabling infectious diseases, such as tetanus, leprosy, tuberculosis, measles, poliomyelitis. While these diseases are far from all under control, we are witnessing the emergence of non-communicable diseases, such as high blood pressure and

diabetes mellitus, which are developing at a worrying epidemic pace [1, 2]. Diabetes, a non-communicable, lifestyle-related disease, is now seen not only as a public health problem but also as an economic and political problem for both industrialised and developing countries [3, 4]. In 2012, the number of diabetics worldwide was estimated at 347 million according to the WHO [5]. The number of diabetics will be proportionally higher in developing countries, particularly in Africa, where the number of diabetics is expected to increase from 10.4 million in 2007 to 18.1 million in 2025, according to the International Diabetes

Federation (IDF) [6]. In Côte d'Ivoire, the International Diabetes Federation estimates that the number of diabetics is expected to increase from 502 000 in 2013 to 965 000 in 2035 [7]. Exposing to serious complications, diabetes management is essential. This management calls for hygienic-dietary rules that are an integral part of the treatment. Given the unanimously recognised beneficial effect of hygienic and dietary measures on health, it seemed appropriate to carry out a study on this subject among type 2 diabetics followed up in the public health structures of the city of Bouaké. The aim of this work is to improve their care by better promoting these measures.

## 2. Methods

We conducted a cross-sectional study over a two-month period from 27 September to 30 November 2019 in the commune of Bouaké. With a population of 680,694 inhabitants according to the 2011 general population and housing census [8], this municipality is the second most populous in Côte d'Ivoire after the economic capital Abidjan. This commune has two public consultation facilities for diabetic patients. These structures are the consultation pool of the Hospital and University Center of Bouaké and the Maternal and Child Protection Center of Sokoura.

As we do not have precise information on the proportion of diabetics who comply with dietary hygiene measures, we have chosen the value of 50%. Thus, to determine the sample size, we applied the Schwartz following formula:

$$n = z^2pq/i^2$$

n = sample size

p= 50 %

q = 1-p = 1 - 0,5 = 0,5

z=1.96 for an  $\alpha$ -error risk of 0.5

i=statistical precision set at 0.05

Thus,  $n = 1.96^2 \times 0.5 \times 0.5 / 0.05^2 = 385$

The figure obtained by the calculation was increased by 10% to take account of non-respondents, giving a size of 424 persons. This number was divided equally between the two facilities to be visited, i.e. 212 people in each centre. Given the unavailability of a database of diabetic patients, we proceeded by convenience sampling consisting of including consecutively the patients seen in consultation at the consultation pool (CHU) and at the Child Protection Center of Sokoura. We attended these services until we reached the

required number of subjects determined above.

Inclusion criteria All diabetic subjects, followed for at least six months, who visited one of the two centres during the study period.

Non-inclusion criteria: Any patient with any of the following barriers:

- 1) a language barrier (ethnicity rarely spoken in Côte d'Ivoire)
- 2) an inability to speak (language impairment)
- 3) a physical disability (amputee)

We designed an anonymous, structured, standardised, administered questionnaire for this purpose. This questionnaire was validated on a sample of 10 diabetics at the Saint Camille medical centre.

The data collected was entered and processed using SPSS.20 software. Quantitative variables were expressed as positional parameters and qualitative variables as proportions.

### *Ethical Considerations*

We protected the confidentiality of the information provided by assigning an anonymous identification code to each survey form. The respondents' participation was free and obtained after informed consent and verbal agreement. The conduct of the field survey required the obtaining of authorization from the regional health authorities and the medical and scientific directorate of the Bouaké Hospital and University Centre.

## 3. Results

### *3.1. Socio-Demographic and Economic Characteristics (Table 1)*

Patients aged between 51 and 60 years accounted for 36.9% of the total number of patients. Of these patients, 65.57% were female. Housewives were the most numerous (34.7%). Cohabitation was the most common matrimonial regime (52.8%). The diabetics surveyed had no formal education and had a monthly income in 53.3% and 58.3% of cases respectively. The average income for those who had it was FCFA 96225 (151,5 USD). They spent an average of FCFA 21700 (34,17 USD) per month on care. The average daily expenditure on food was FCFA 2000 (3,15USD). Almost all diabetics had no health coverage (92.7%). Diabetes care was the exclusive responsibility of the patient in 54.5% of cases.

*Table 1. Sociodemographic characteristics 1USD= 640,39 FCFA.*

VARIABLES	MODALITIES	PERCENTAGE
Age (years old) (n=398)	Under 50	24,6
	51-60	36,9
	61-70	31,9
	over 70	6,5
	Sex (n=398)	Women
Profession (n=398)	housewives	34,7

VARIABLES	MODALITIES	PERCENTAGE
Marital status (n=398)	liberal profession	30,2
	public officials	16,6
	Retired/unemployed	16,6
	unmarried	5,8
	concubinage	52,8
Level of school education (n=397)	married	22,6
	Widow	18,8
	No	53,3
	Primary school	23,6
Possession of a monthly income (n=398)	High school	19,6
	Graduate school	3,3
	Yes	58,3
	No	41,7
Average monthly income (n=232)	96244 FCFA (150,29 USD*)	
Average monthly expenditure on care (n=380)	21700 FCFA (33,89 USD*)	
Average daily expenditure on food (n=380)	2000 FCFA (3,12 USD*)	
Possession of health insurance (n=398)	non	92,7
Person in charge of care (n=398)	The patient	54,5
	Another person	45,5

### 3.2. Hygienodietetic Measures (Table 2)

Patients were at least overweight in 65.3% of cases. Oral antidiabetic treatment monotherapy was the most found (50.25%). They had been sensitized to the practice of physical activity in a proportion of 88.9%. They reported physical activity in 68.6% of cases. Walking was the most common physical activity among these diabetics (78.4%). The weekly frequency of this practice was at least 3

times/week in 61.25% of cases. No physical activity was performed by 31.4% of subjects. Lack of motivation was the main reason given (56.2%). Diabetics interviewed were sensitized to the usefulness of an adapted diet in 97.2% of cases. However, they maintained the same eating habits as other family members in 49.9% of cases. Patients were made aware of the need for foot care in 84.8% of cases. However, the most common equipment used to do this were nail clippers (46.90%) and blades (39.20%).

*Table 2. Hygienodietetic measures.*

VARIABLES	MODALITIES	PERCENTAGE
BMI (kg/m <sup>2</sup> ) (n=398)	< 18,5	4,3
	18,5 to 24,5	27,9
	> 25	65,3
Diabetes treatment (n=398)	Oral antidiabetic	50,25
Raising awareness of physical activity (n=397)	Yes	88,9
	No	11,1
Practice of physical and sports activities (n=398)	Yes	68,6
	No	31,4
Type of physical activity (n=273)	Walking	78,4
Reasons for non-practice (n=121)	Age	9,1
	others	33,9
	lack of motivation	68,2
Raising awareness of appropriate diet (n=397)	Yes	97,5
	No	2,5
No change in dietary habits (n=395)	Yes	49,9
	No	50,1

VARIABLES	MODALITIES	PERCENTAGE
Foot care awareness (n=396)	Yes	84,8
	No	15,2
foot care (n=375)	Yes	94,7
	Equipment used for foot care (n=375)	
	Nail clipper	46,9
	Blade	39,2
	Lime	7,2
	Pair of scissors	6,6

## 4. Discussion

### 4.1. Difficulties in Collecting Data and Limitations of the Study

We announced 424 people as the sample size. After the various analysis of the survey forms, 398 were indeed used, or 93.9% of all the forms collected. It is not excluded that some people are prevaricating on certain issues to embellish their image.

### 4.2. Sociodemographic and Economic Characteristics

In the African region, the prevalence of diabetes is higher between the ages of 55 and 64 [9]. Yao and Coll found an average age of 57 years [10]. The female predominance in our study could be explained by the fact that hormones and motherhood promote weight gain, a cause of cardiovascular disease. The percentage of girls in primary education is less than 45% in six countries: Côte d'Ivoire, Benin, Mali, Niger, the Central African Republic and Chad [11]. According to the United Nations Development Programme (UNDP), the poor person refers to an individual who receives less than two US dollars a day [5]. The predominance of low-income patients poses the management problem since treatment is expensive and is done for life. This observation is also shared by Yao A. et al [10]. In Côte d'Ivoire, the cost of treatment represents 70 to 96% of the family budget for the poorest patients and 25 to 55% when they have average incomes. However, the amount of these expenses does not take into account the indirect costs, nor that of complications and hospitalizations related to the disease [6, 9]. In Côte d'Ivoire, some chronic infectious diseases such as HIV and tuberculosis are treated completely free of charge [12]. The proportion of subjects receiving health insurance in Africa does not exceed 80% of the population [13]. In Western countries such as France where there is social security, patients suffering from defects such as diabetes are treated [7, 14]. In sub-Saharan Africa, there are social security programs everywhere. However, the actual implementation of these projects is still in its infancy.

### 4.3. Hygienodietetic Measures

The predominance of overweight in our subjects can promote the occurrence of disease. Abdominal obesity is associated with different metabolic and vascular risk factors.

It is independently associated with early mortality [15]. The majority of the diabetics interviewed were made aware of the need for physical activity and sports, of the need for proper nutrition for their health and the need for foot care. Such actions can be attributed to health professionals. However, the appropriate perception of the appropriateness of this advice by patients may be lacking as they rarely have a high level of school education. As far as diet is concerned, it must be recognised that type 2 diabetics should not follow a diet in the true sense of the term. There are just a few guidelines to follow [3]:

- 1) Eat three meals a day (breakfast, lunch and dinner) [16].
- 2) Choose complex carbohydrates instead of simple added carbohydrates that are better to consume for pleasure, exceptionally and in small quantities.
- 3) Limit "added sugars" (biscuits, pastries, sweets, milk desserts, ice cream, etc.) which must account for a maximum of 10% of the total carbohydrate ration.
- 4) Promote the consumption of dietary fibre (fruits, vegetables) [17].
- 5) Balance glucido-lipid intakes over three regular daily meals.
- 6) Making the right choice with knowledge of foods rich in sugars and fats, to better manage the amount consumed and the frequency of consumption.
- 7) Vary the menus by controlling the carbohydrate equivalents and the hyperglycemic power of food.

The requirements of such a diet are difficult to meet as patients will not know which food to choose [18]. This difficulty is reinforced by their low level of schooling and their low level of income. This is the place to urge Ivorian dietetic researchers to intensify research on our local foods in order to propose dishes adapted to the living conditions of our populations.

Moderate intensity physical activity combined with resistance-type activity is recommended [19]. Furthermore, in type 2 diabetic patients practising regular physical activity, there is a favourable effect on glycaemia (on average, a decrease in glycated haemoglobin of 0.6%, which produces the same hypoglycaemic effect as some oral antidiabetic drugs), on the lipid profile (increase in HDL-cholesterol and decrease in triglycerides) and also on blood pressure, even in the absence of weight loss [20, 21]. It is important to encourage the population in general and diabetics in particular to practice walking, which requires no financial means. In the absence of contraindications, 150 minutes per week of brisk walking over a distance of at least one

kilometre is recommended [22]. The material used by these patients for nail care was not in line with the preventive measures for the diabetic foot, according to which nail clipping with blades was proscribed in favour of the use of files [23]. The diabetic foot is a real danger both because of its morbid clinical consequences, of which the ulcer is a consequence that generates severe functional handicaps, and because of its considerable economic consequences [24] that must be avoided as much as possible.

## 5. Conclusion

Poor people pay the highest price for diseases such as diabetes. The fight against poverty and illiteracy is key to achieving effective treatment results.

## Conflict of Interest

All the authors do not have any possible conflicts of interest.

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