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Dietary Surveys Carried out among Diabetic Patients Hospitalized in the Metabolic and Endocrine Diseases Department of the C.H.U-B

Lewis Raud Miamb[1], Bertin Mikolo[1], Melyna Aïcha Ntsan[1], Bonaventure Max Lazare Peneme[2], Arnaud Wilfrid Etou Ossibi[2,3]

[1]Laboratory for the Valorization of Agro-Resources, Ecole Nationale Supérieure Polytechnique, Marien Ngouabi University, Brazzaville, Republic of the Congo
[2]Laboratory of Pharmacodynamics and Experimental Physiopathology, Faculty of Science and Technology, Marien Ngouabi University, Brazzaville, Republic of the Congo
[3]Laboratory of Biochemistry and Pharmacology, Faculty of Health Sciences, Marien Ngouabi University, Brazzaville, Republic of the Congo
Email: lewismiamb124@gmail.com

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Abstract

A varied and balanced diet has always been essential in the optimal management of diabetes. The objective of this work was to evaluate dietary surveys among 50 diabetic patients hospitalized in the metabolic and endocrine diseases department of the Brazzaville Hospital and University Center. This survey was carried out using two methods: dietary history and 24-hour recall. The results relating to the dietary history revealed in the patients a dietary imbalance characterized by snacking at meals, non-compliance with a balanced diet and a high frequency of consumption of foods rich in simple sugar. and saturated fats. Regarding the 24-hour recall, the survey showed that the average blood sugar levels of hospitalized patients increased depending on the number of meals. This meant that these hyperglycemias (2 to 5 g/L) observed in these patients exceeded three meals per day and required, among other things, an increase in insulin intake or doses. The age groups of diabetic patients were also divided. These age groups had partly defined the types of diabetes encountered. Regarding body mass index, women had a body mass index greater than 30 kg/m^2 compared to men. This increase in body mass index was explained by being overweight or even obese due to excess body fat.

Keywords

Diabetes, Dietary Survey, Dietary History, 24-Hour Recall

1. Introduction

Diabetes is a chronic metabolic disorder, characterized by persistently high blood glucose levels. This is because the body does not produce enough insulin or does not use it adequately. In both cases, diabetes prevents the body from metabolizing or using carbohydrates efficiently in addition to proteins and fats [1]-[3]. This is a typical example of a disease of civilization. In recent years, scientists have carried out epidemiological studies showing an increase in the number of cases per year in the world [4]-[6]. They estimated that this disease is the direct cause of approximately one million deaths per year. Unfortunately, Congo is not immune to this worrying evolution of the latter. This evolution is often due to the aging of the population, but especially to a sedentary lifestyle and a diet rich in fast sugar and saturated fat, because there is a correlation between diet and diabetes [7] [8]. In addition to the composition of foods, the order in which we consume them can influence the overall glycemic response of our body. The results of the STEPS survey conducted by the WHO in 2005 in Brazzaville showed a prevalence of 7% in the population studied, in addition to more than 20,000 cases of diabetes per year were recorded at the Brazzaville University Hospital [9]. Given these alarming figures, measures have been strengthened in several sectors. The Ministry of Health, in collaboration with other institutions and international organizations, had set up nutritional education services at the Brazzaville University Hospital, as in other centers also in order to prevent secondary complications of diabetes [9].

It is with this in mind that this study was to conduct a dietary survey among diabetic patients hospitalized at the Brazzaville University Hospital.

2. Materials and Methods

2.1. Materials

The teaching materials consisted of survey sheets (food history sheet and 24-hour recall sheet) developed to obtain information on the dietary habits of patients before their hospitalization and the composition of each patient's meals during their hospitalization in the department.

In addition to the survey forms, the patients' medical records allow us to know the reasons for their hospitalization and the cycle book allows us to have the blood sugar levels at 7 a.m., 1 p.m. and 7 p.m. of hospitalized patients were used during the survey.

2.2. Methodology

The field work was characterized by a dietary survey of patients hospitalized at the C.H.U-B, more precisely in the metabolic and endocrine diseases department. The survey took place from April 20 to July 20, 2024 with 50 patients, including 25 women and 25 men. During this survey, two methods were used: the dietary history and the 24-hour recall [10] [11]. Food history, one of the food survey methods seeking to assess the typical eating habits of patients. It focused

on collecting data on:

- The tastes and eating habits of patients before their hospitalization;
- The usual times of breakfast, lunch and dinner;
- The number of meals per day;
- The frequency of alcohol consumption;
- The frequency of vegetable consumption;
- The frequency of fruit consumption;
- The consumption of the number of liters of water per day.

As for the 24 hours recall, a qualitative food survey method aimed at collecting thein formation on the foods consumed during the day by hospitalized patients.

It focused on collecting data on:

- Blood sugar control times (7 a.m., 1 p.m. and 7 p.m.) from patients during their hospitalization;
- Insulin or ADO intake times;
- Breakfast, lunch and dinner times;
- Number of meals per day;
- Principles of dietary errors.

3. Data Processing

The processing of data obtained from the various surveys, as well as the entry and production of raw tables were carried out using Excel software (Office 2018).

4. Results and Discussion

4.1. Results

4.1.1. Dietary History of Diabetic Patients Surveyed in the Metabolic Diseases Department

According to the dietary history, we were able to list some attitudes or behaviors of diabetic patients based on some dietary history parameters retained. This information is presented in Table 1 below.

Table 1. Dietary history of diabetic patients.

Food History Parameters	Patient attitude or behavior
Tastes and eating habits of patients before hospitalization.	Dietary imbalance characterized by an excess of foods rich in fast sugar and saturated fats.
Usual times for breakfast, lunch and dinner.	Failure to respect meal times.
The number of meals per day.	Failure to respect the number of meals caused by snacking.
Frequency of consumption of alcoholic and sugary drinks.	High and frequent consumption of drinks (alcoholic and sugary).
Frequency of vegetable consumption.	Low vegetable consumption.
Frequency of fruit consumption.	Low fruit consumption.

4.1.2. Identification of Diabetic Patients According to Gender and Age Groups

Table 2 below shows the distribution of diabetic patients according to gender and age groups. It is clear from this table that the age groups ranging from 20 to 30 years and 50 to 90 years old have more diabetic patients than others during this survey.

Table 2. The distribution of patients according to gender and age groups.

Age groups (years)	Sex		Total
	Male	Female	
	n	n	n
15 - 20	2	2	4
20 - 30	6	7	13
30 - 50	5	6	11
50 - 70	5	7	12
70 - 90	7	3	10
Total	**25**	**25**	**50**

n: number.

4.1.3. Identification of Diabetic Patients According to Gender and Body Mass Index

Table 3 below shows the distribution of diabetic patients according to gender and body mass index. It is clear from this table that women had a BMI greater than 30 kg/m^2 compared to men.

Table 3. Distribution of patients according to gender and body mass index.

Body Mass Index (kg/m^2)	Sex		Total
	Male	Female	
	n	n	n
<18.5	10	4	14
18.5 ≤ Body Mass Index ≤ 24.9	3	5	8
25 ≤ Body Mass Index ≤ 30	3	3	6
Body Mass Index ≥ 30	9	13	22
Total	**25**	**25**	**50**

n: number.

4.1.4. Variation in Patients' Glycemic Averages According to the Times and Number of Daily Meals

Figure 1 below shows the variation in patients' glycemic averages according to the times and number of daily meals, it is clear from this figure that the patients' glycemic averages increased according to the number of meals.

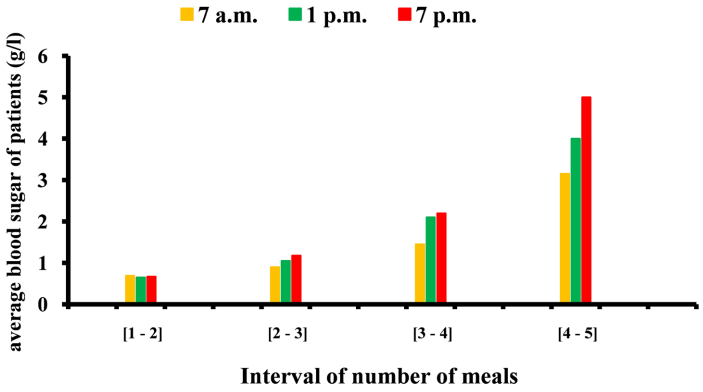

Figure 1. Variation in patients' glycemic averages according to the times and number of daily meals.

4.1.5. Variation in Patients' Insulin Intake According to the Number of Daily Meals

Figure 2 below shows the variation in the average insulin intake of patients according to the number of daily meals. It is clear from this figure that the insulin intake of patients increases according to the number of meals.

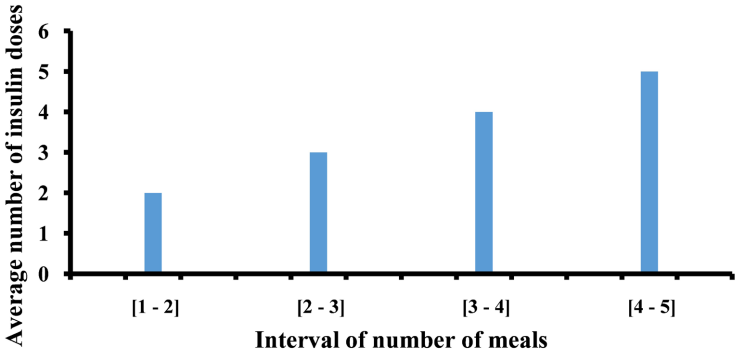

Figure 2. Variation in insulin intake depending on the number of daily meals.

4.2. Discussion

4.2.1. Dietary History

Dietary history was one of the methods used during our survey of diabetic patients. This method allowed us to assess the typical eating habits of patients, by collecting qualitative and even quantitative information on foods consumed daily at breakfast, lunch, dinner and their frequency of consumption. Our results presented in **Table 1** show that in most cases, diabetic patients had a dietary imbalance characterized by snacking at meals, failure to follow the food square, the number of meals per day and especially a high frequency of consumption of foods rich in simple sugar, saturated fats and alcoholic beverages. The low frequency of consumption of fruits and vegetables was also noted. Our results are contrary to those obtained by de Itoua [12] according to which leafy vegetables were widely consumed in Brazzaville by populations. This dietary imbalance observed in the greatest number of diabetics surveyed, opens the door to many pathologies including

hypertension, obesity and cardiovascular diseases. Indeed, many studies indicate that a poor diet (foods rich in saturated fats) especially in people with a family history of diabetes, are exposed to significant weight gain and the onset of metabolic and cardiovascular disorders [13]. These foods increase the level of bad cholesterol in the blood which leads to hyperlipidemia. This will create fatty deposits on the blood vessels and form clusters called "atheroma plaques". When these atheroma plaques thicken, they cause a narrowing of the arteries, which will hinder blood circulation and lead to various symptoms: chest pain, dizziness, shortness of breath. The situation worsens when the plaques rupture and form blood clots that will block blood circulation in an artery and thus cause a myocardial infarction or lead to a stroke by blocking small blood vessels in the brain [14]. In addition, a dietary deficiency in nutrients contained in vegetables and fruits also weakens the immune system and makes it more sensitive and accessible to infections [15]. Our results are similar to the World Diabetes Report produced by the World Health Organization in 2016 [16].

Regarding the distribution of patients according to age group, **Table 2** shows that the age groups ranging from 20 to 30 years and from 50 to 90 years have more diabetic patients than others during this survey. These age groups partly define the type of diabetes known, because according to scientists, type 1 diabetes, also known as juvenile diabetes or insulin-dependent diabetes, most often begins in childhood or adolescence. It is due to a lack of insulin secretion by the pancreas [17]. As for type 2 diabetes, known as adult diabetes or non-insulin-dependent, represents 90% of adult cases. However, it can appear in adolescence due to the increase in cases of overweight. It is due to poor use of insulin by the body's cells. Its development is very gradual [18] [19]. Regarding the body mass index, which is a quantity used to estimate a person's corpulence [20], the distribution of patients according to the Body Mass Index (**Table 3**) showed according to our survey that women had a Body Mass Index greater than 30 kg/m^2 compared to men. This increase in Body Mass Index, expressing overweight or even obesity, is often due to excess body fat. This corresponds to all the body fat (or adipose tissue). In reality, obesity and diabetes both have comorbidity risk factors. The greater the amount of fat in the body, the more insulin the body needs. Being overweight or obese significantly increases the risk of developing type 2 diabetes [21] [22]. Our results are consistent with those of Berriche who showed that out of the 164 diabetics surveyed, 121 subjects were obese.

4.2.2. 24-Hour Recall

The 24-hour recall was also one of the methods used during our survey of diabetic patients. This method allowed us to collect dietary and daily information during their hospitalization. **Figure 1** shows the variations in patients' glycemic averages according to the number of meals per day, it appears from this figure that the average blood sugar levels of the patients increased according to the number of meals. In fact, there were on the one hand patients who had

hyperglycemia (2 to 5 g/L) and on the other hand patients who had normal

blood sugar levels (0.75 to 1.08 g/L) throughout the day. These hyperglycemias observed in these patients were due to the consumption of foods rich in fast sugar, snacking between meals and non-compliance with the number of meals per day and required an increase in insulin intake and doses. Because it was noted during the survey that the variation in insulin intake increased according to the number of meals per day (**Figure 2**). According to nutritionists, foods based on simple carbohydrates, also called simple sugars, are rapidly digested and cause a rapid increase in blood sugar. They are found in foods such as sodas, sweets, pastries, refined grains, and white flour products. These foods have a high glycemic index, which means that they cause a rapid rise in blood sugar levels [23]. Our results are consistent with those of Berriche. For patients with normal blood sugar levels, their diet was based on foods (low and moderately hyperglycemic) and strict adherence to the number of meals daily thanks to the application of nutritional restrictions carried out by the dietician-nutritionist of the service. Because a healthy and appropriate diet provides the vitamins, trace elements and minerals useful for our physical balance [24] [25]. It is from moderately hyperglycemic foods that we find complex sugars and dietary fibers [26]. Indeed, complex carbohydrates are digested more slowly, which leads to a slower and more stable rise in blood sugar. They are found in foods such as whole grains, legumes, fruits and vegetables.

These foods have a lower glycemic index, which means that they cause a more moderate increase in blood sugar levels [27] [28]. As for dietary fibers, they slow down the digestion of carbohydrates, which allows a slower absorption of glucose into the blood. They therefore help maintain more stable blood glucose levels [29]. In addition, fiber promotes a feeling of satiety, which can help with weight management, an essential aspect of diabetes control [28] [30] [31].

5. Conclusion

At the end of our survey, it probably appears that diabetes is one of the major public health problems affecting our society. However, this disease which presents different risk factors obviously requires good practice regarding methods relating to medicine and nutrition. Nevertheless, non-compliance with a balanced diet, the high frequency of consumption of foods rich in fast sugar as well as meal times constitute one of the direct causes of hyperglycemia among patients hospitalized in the metabolic and endocrine diseases department of the Brazzaville University Hospital. As the results have shown, there is a link between diet and diabetes. This is why a balanced diet is part of the treatment of diabetes.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Food History Sheet of Diabetic Patients Hospitalized at the S.M.M.E of the C.H.U of Brazzaville

_____ Confidential _____

Name(s) and first name(s):

Sex:

Address:

City:

Phone:

Date of birth:

Pathology(ies):

Room No.:

NUTRITIONAL STATUS

Height (m):

Current weight (kg): Usual weight (kg):

BMI (kg/m^2):

Appetite: Preserved Moderate Non-existent

MEDICAL DATA

Type of diabetes: DST1 DST2

Other pathologies:_____

Blood sugar on arrival at the SMME:_____

Glycated hemoglobin:_____

Blood pressure on arrival at the SMME:_____

Patient Questionnaire on Dietary Habits

Have you ever received nutritional or dietary advice from a health professional? Yes No

If yes, which ones and by which health professionals?

Answer:_____

_____

_____

_____

How many meals do you eat per day?

Answer:_____

What are the exact times of your meals?

Answer:_____

Do you drink alcohol? Yes No

If yes, frequently or occasionally?

Do you drink sugary or carbonated drinks? Yes No

If yes, which ones? How?

Answer:_____

_____

How long have you been suffering from this disease?

Answer:_____

What foods do you usually eat for breakfast?_____

_____

What foods do you usually eat for dinner?

Answer:_____

_____

_____

_____

What foods do you rarely eat?

Answer:_____

_____

What foods cause abnormal reactions (allergies) for you?

Answer:_____

How many liters of water do you drink per day?

Answer_____

Do you practice sports? Yes No

If yes, which one and how?_____

_____

Do you take food supplements?

If yes, which ones?_____

Other information:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

24-Hour Recall Sheet for Diabetic Patients Hospitalized at the S.M.M.E of the C.H.U of Brazzaville

Name(s) and first name(s):

Sex:

Address:

City:

Telephone:

Age:

Pathology(ies):

Room No.:

CRITERIA FOR THE 24-HOUR RECALL

1) Time of blood sugar control:_____

2) Time of insulin or ADO intake:_____

3) Time of breakfast:_____

4) Composition of breakfast:_____

5) Time of blood sugar control:_____

6) Time of insulin or ADO intake:_____

7) Time of lunch:

_____

8) Composition of lunch:_____

9) Time of blood sugar control:_____

10) Time of insulin or ADO intake:_____

11) Dinner time:_____

12) Composition of dinner:_____

Other information:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____