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Characteristics of the Food Served to Type 2 Diabetic Patients Hospitalized At Angré Chu (Abidjan, Côte D'Ivoire)

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Abstract Just like outpatients undergoing treatment, hospitalized patients must have a good diet for better management of diabetic disease. The general objective of this work was to characterize the diet served to diabetic patients hospitalized at the Angré University Hospital. To do this, the profile of the patients and the different meals served to them were analyzed. The interactions between some patient characteristics and the evolution of blood sugar levels the next day were then studied. The results showed that 94.60% of the patients were over 40 years old and the majority of patients were admitted to the Angré University Hospital. Following hypoglycemia (24.32%) or hyperglycemia (45.95%). A number of patients had known diabetes for more than 2 years (67.54%) and mainly presented cardiac complications. The foods served by the University Hospital to patients were varied, diversified and mainly consisted of liquid or semi-liquid foods for breakfast, typical Ivorian dishes for lunch and vegetables or legumes for dinner. On average, 50 to 200 g, 150 to 250 g and 200 to 250 g of meals were served for breakfast, lunch and dinner, respectively, to each patient. The duration of discovery of diabetes and the occurrence of complications in patients were the main factors influencing the evolution of patients' blood sugar levels the next day. For a better balance of their blood sugar levels, patients must have greater compliance with the recommendations, the older the diabetes, in order to avoid the occurrence of complications.

Keywords: *diabetes, diets, blood sugar, diabetic diet, Angré University Hospital*

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1. Introduction

Considered a pandemic by the World Health Organization (WHO), diabetes is one of the most widespread non-communicable diseases [1] and is one of the leading causes of morbidity and mortality worldwide. This pathology is associated with several complications such as micro-angiopathies (diabetic nephropathy, neuropathy and retinopathy) and macro-angiopathies (atherosclerosis). Diabetes is characterized by a fasting blood sugar level greater than or equal to 1.26 g/L (or 7 mmol/L). This hyperglycemia may be due to a relative or absolute deficit in the secretion and/or action of insulin [2]. In 2021, more than 537 million people were affected by diabetes worldwide. Current forecasts are very worrying and predict 643 million diabetic patients in 2030 and 784 million in 2045 [3]. This galloping progression does not spare Africa with 14.7 million people living with diabetes in 2011 [4], 16 million in 2017 and a forecast of 41 million in 2045. Africa is the part of the world that recorded the highest increase, i.e. 156% [5]. In Ivory Coast, this prevalence was estimated at 6.2% in 2022 [6].

After the diagnosis of the disease, whether the diabetic patient receives outpatient care or is hospitalized, the health-dietary and medicinal measures prescribed to him aim to balance his blood sugar and delay or treat complications. Hygiene-dietary measures in general and the diet in particular are mainly aimed at correcting the metabolic abnormalities characteristic of diabetic disease and maintaining a normal weight [7]. Do diabetic patients hospitalized in particular at the Angré University Hospital benefit from food served by the catering service, which can help to better manage their illness?

The general objective of this work was to characterize the meals served by the Angré University Hospital to hospitalized diabetics. To do this, the patient profile (socioeconomic and demographic, the determinants of diabetic disease) was first determined. Then, the different meals served at breakfast, lunch and dinner were characterized.

2. Materials and Methods

2.1. Material

Survey sheet

Survey sheets made it possible to collect information relating to the identification of each patient (surname, first names, sex and age), the medical context (reason for hospitalization and type of diet), anthropometric and biological parameters, and daily diet during hospitalization.

2.2. Methods

2.2.1. Survey of Diabetic Patients

2.2.1.1. Type and Period of Study

This is a prospective and retrospective study with analytical purposes. It took place from March 27 to June 27, 2023.

2.2.1.2. Study Site

The study took place within the University Hospital Center (CHU) of Angré which is located in the District of Abidjan precisely in the commune of Cocody.

2.2.1.3. Study Population

The study population consisted of diabetic patients hospitalized in the internal medicine and geriatrics department of the Angré University Hospital during the study period. In total, 37 people participated in the study.

Patients hospitalized for at least 3 days before the start of the survey were included.

Ambulatory diabetic patients and those who did not give their consent did not participate in the study.

2.2.2. Statistical Analysis

All the data obtained were processed using SPSS statistics IBM version 2016 software at the 5% threshold.

3. Results and Discussion

3.1. Results

3.1.1. Profile of Patients Hospitalized At AngrÉ University Hospital

3.1.1.1. Socioeconomic and Demographic Characteristics of Patients

Nearly half of the patients (37.85%) came from the commune of Cocody and a few from the other communes of Abidjan (5.40% from Abobo; 2.70% from Adjamé, Port-Bouët, Yopougon) or surrounding towns of Abidjan (5.40% of Dabou; 2.70% of Bingerville, Bonoua, Daloa) (Table 1). Most of the patients (48.65%) were adults, aged between 40 and 65 years or elderly people, aged over 65 (45.95%). There were 56.76% men and 43.24% women, working in various professions (21.63% housewives, 16.22% teachers, 13.51% traders, and 13.51% manager's average) and having various levels of education (40.54% primary level, 32.43% secondary level, 08.11% higher level).

Table 1. Socioeconomic and demographic characteristics of patients surveyed at entry

	Effective	Proportion (%)
Place of residence		
Cocody	16	43.25
Abobo	3	08.11
Adjamé	3	08.11
Port-Bouet	2	05.40
Yopougon	2	05.40
Dabou	3	08.11
Bingerville	3	08.11
Bonoua	3	08.11
Daloa	2	05.40
Age (year)		
[18 ; 40[	2	05,40
[40 ; 65]	18	48,65
Over 65 years old	17	45,95
Sex		
Male	21	56,76
Female	16	43,24
Occupation		
Teacher	6	16,22
Trader	5	13,51
Clothed bodies	5	13,51
Fashion designer	4	10,81
Site manager	4	10,81
Middle management	5	13,51
Housewife	8	21,63
Educational level		
Primary	15	40,54
Secondary	12	32,43
Supérior	10	27,03

3.1.1.2. Characteristics Of Patients' Diabetic Disease At Entry

Most of the patients had been hospitalized either for hypoglycemia (24.32%), or for hyperglycemia (29.73% between 2 and 4 g/L; 24.32% greater than 4 g/L) and all (100%) had type 2 diabetes (Table 2). More than half (51.35%) were hypertensive and almost all were under modern medical-pharmaceutical treatment (97.30%). The patients were either on insulin (40.54%), or on oral antidiabetics (OAD) (35.13%), or the OAD + insulin combination (10.81%) but very few (13.52%) were only under diet. A large number of these patients had a family history of diabetes (67.56%) and had known diabetes for more than 2 years (72.98%).

3.1.2. Nutrition of Diabetic Patients Hospitalized At the AngrE University Hospital

3.1.2.1. Eating Behaviors of Patients During Hospitalization

The majority of patients (72.97%) did not exclusively consume meals served by the CHU catering service. A greater number of meals from outside the CHU were prepared in restaurants around the CHU (88.89%) and few were prepared by the patients' parents at their homes (11.11%) (Table 3). Almost all patients measured food before consumption (91.89%) and took hot milk (91.89%) as a liquid drink other than water. More than half did not skip meals (78.38%), and took snacks (54.05%) mainly out of desire (100%). Not all patients chose the meals they ate themselves.

Table 2. Characteristics of diabetic disease of patients at entry

	Effectif	Proportion (%)
Blood sugar (g/L)		
Less than 0,70	09	24.32
[0,70, 1,40[	03	08.12
[1,40, 2[	05	13.51
[2, 4 [	11	29.73
More than 4	09	24.32
Blood pressure (cmHg)		
Hypotension	06	16.22
Normal voltage	12	32.43
Hypertension	19	51.35
Type of diabetes		
Type 1	0	0
Type 2	37	100
Type of treatment		
Oral antidiabetics (OAD)	13	35.13
Insulin	15	40.54
OAD + insulin	04	10.81
Diet	05	13.52
Followed treatment model		
Modern treatment	36	97.30
Traditional treatment (herbal)	01	02.70
Family history of diabetes		
Family history	25	67.56
No family history	12	32.44
Duration of discovery of diabetes		
Less than 6 months	05	13.51
[6 months – 2 years]	05	13.51
More than 2 years	27	72.98

Table 3. Eating behaviors during hospitalization

		Effective	Proportion (%)
Origin of food consumed			
Exclusive consumption of meals served by the CHU		10	27.03
Consumption of cooked food outside the hospital		27	72.97
Source of other meals not coming from the CHU			
Home		03	11.11
shop		24	88.89
Quantity of food consumed			
Measuring food before consumption		34	91.89
No measuring food before consumption		03	08.11
Beverages consumed other than water			
hot milk		34	91.89
yogurt		20	54.05
Consumption of three main meals per day			
Regular skipping of meals		08	21.62
No skipping meals		29	78.38
Preference of foods eaten			
Personal choice of meals before consumption		0	0
No personal choice of meals before consumption		37	100
Meal splitting			
Snacks		20	54.05
No snacks		17	45.95
Reason for snacking	Envy	20	100
	Others	0	0

3.1.2.2. Characteristics of the Meals Served by the AngrE University Hospital

3.1.2.2.1. Quality and Quantity of Food Served

The foods served by the Angré University Hospital to patients were varied and diverse. They consisted of liquid or semi-liquid foods for breakfast, typical Ivorian dishes for lunch, and vegetables and legumes for dinner (Table 4). Among liquid or semi-liquid foods, those that appeared

most often on the menu were rice porridge + powdered milk + bread; millet porridge + powdered milk + bread; corn porridge + powdered milk + bread; oatmeal + powdered milk + bread; hot powdered milk + bread. On average, 150 to 200 g ± 50 g of porridge, 150 to 200 g ± 50 g of oatmeal, 50 to 60 g ± 10 g of powdered milk and 40 to 50 g ± 5 g of baguette bread were served to each patient per meal. Among the typical Ivorian dishes, those most served were rice + vegetable sauce; rice + eggplant sauce; rice + gouagouassou sauce; rice + N'tro sauce; rice + tomato sauce; rice + macedonia; attiéké + light sauce; yam + vegetable paste; placali + fresh okra sauce; toh + fresh okra sauce. An average quantity of 150 to 250 g ± 50 g of rice, attiéké, yam, placali and toh served to each patient per meal.

Among the vegetables and legumes, peas, white beans, vegetable gardener, soybeans, avocado, green beans, Macedonia, vegetable stir-fry were the most served to patients. On average, a quantity of 200 to 250 g ± 50 g of vegetables or legumes was served to each patient per meal.

3.1.2.2.2. Macromolecule Composition of Meals Served At the AngrE University Hospital

Table 5 presents the macronutrient composition of breakfast, lunch and dinner served to diabetics hospitalized at the Angré University Hospital.

The different foods served at breakfast all provided small quantities of carbohydrates, lipids and proteins with values respectively between 29.92g and 56.74g; 02.11g and 02.83g; 05.49g and 06.71g. On the other hand, the quantities of fiber were sufficient with values varying between 1.5g and 3.12g.

The majority of foods served at lunch provided recommended amounts of carbohydrates (between 79.21 and 148.20g), low amounts of fat (between 14.28 and 27.49g), high amounts of protein (between 46.45g) and 50.08g) and sufficient amounts of fiber (between 2.15 and 12.76g). However, Placali + kôpê sauce and Kabato kôpê sauce provided greater quantities of carbohydrates (252.36g and 217.96g respectively).

Most of the meals served at dinner generally provided low quantities of carbohydrates (between 37.82 and 68.42g) and lipids (between 07.66 and 27.73g), recommended quantities of proteins (between 14.02g) and 39.84g) and high amounts of fiber (between 5.71 and 31.86g). However, white beans provided greater amounts of carbohydrates (180.18g) and proteins (71.53g).

3.1.3. Influence of Some Patient Characteristics on the Evolution of Blood Sugar the Next Day

Table 6 presents the influence of some patient characteristics on the evolution of blood sugar levels the next day. The statistical analysis showed that only the duration of discovery of diabetes and the occurrence of complications in patients had an influence on the evolution of blood sugar levels the next day. The probability values (P) which were respectively 0.021; 0.004 were all less than 0.05. Indeed, the older the diabetes was (> 2 years), the higher the blood sugar levels the next day. The more complications of diabetes appeared in the patients, the higher the blood sugar levels the next day.

Table 4. Quantity and quality of the different foods served by the Angré University Hospital

	Foods served regularly		Average quantities served (g) per meal and per patient		
BREAKFAST	1. Rice porridge + milk powder + baguette bread 2. Millet porridge + milk powder + baguette bread 3. Corn porridge + milk powder + baguette bread 4. Oatmeal + powdered milk + baguette bread 5. Hot powdered milk + baguette bread		Porridge Oatmeal Powdered milk baguette bread	: : : :	[150 – 200 g] ± 50 g [150 – 200 g] ± 50 g [50 – 60 g] ± 10 g [40 – 50 g] ± 5 g
LUNCH	1. Rice + vegetable sauce 2. Rice + eggplant sauce 3. Rice + gouagouassou sauce 4. Rice + N'tro sauce 5. Rice + tomato sauce	6. Rice + salad 7. Attiéké + light sauce 8. Yam + vegetable paste 9. Placali + fresh okra sauce 10. Toh + fresh okra sauce	Rice Attiéké Yam Placali Toh	: : : : :	[200 – 220 g] ± 50 g [150 – 200 g] ± 50 g [230 – 250 g] ± 50 g [220 – 250 g] ± 50 g [220 – 250 g] ± 50 g
DINNER	1. Peas 2. White beans 3. Vegetable planter 4. Soy	5. Lawyer 6. Green beans 7. Macedonia 8. Vegetable stir-fry	A plate of [200 – 250 g] ± 50 g		

NB: *Attiéké*: traditional dish of Ivorian gastronomy made from cassava; *Placali*: fermented cassava paste of Ivorian origin ; *Toh*: thick paste cooked from cereal flour

Table 5. Composition of carbohydrates, lipids, proteins and fibers of meals served at the Angré University Hospital

		Carbohydrates (g)	Lipids (g)	Protéins (g)	Fibers (g)
BREAKFAS	Rice porridge	56.74±1.25 ^{d}	02.11±0.05 ^{a}	06.71±0.08 ^{b}	01.84±0.03 ^{a}
	Millet porridge	4.02±0.76 ^{b}	02.35±0.11 ^{b}	05.98±0.15 ^{a}	02.34±0.05 ^{b}
	Corn porridge	42.29±1.05 ^{b}	02.65±0.09 ^{c}	06.52±0.95 ^{b}	03.12±0.08 ^{c}
	Oatmeal	52.78±0.92 ^{c}	02.19±0.12 ^{a}	06.34±0.55 ^{b}	01.85±0.01 ^{a}
	Bread + hot milk	29.92±1.11 ^{a}	02.83±0.01 ^{c}	05.49±0.27 ^{a}	01.50±0.04 ^{a}
LUNCH	Rice + vegetable sauce	140.82±6.02 ^{d}	14.35±1.05 ^{a}	47.64±1.08 ^{a}	07.09±1.03 ^{cd}
	Rice + eggplant sauce	138.88±5.92 ^{c}	14.46±2.08 ^{a}	46.90±2.01 ^{c}	06.64±0.91 ^{c}
	Rice + gouagouassou sauce	140.02±3.09 ^{d}	14.52±0.32 ^{a}	47.34±1.85 ^{c}	07.72±1.11 ^{d}
	Rice + n'tro sauce	151.85±1.99 ^{e}	16.05±1.45 ^{b}	48.76±0.95 ^{c}	06.96±0.94 ^{c}

		Carbohydrates (g)	Lipids (g)	Protéins (g)	Fibers (g)
	Rice + tomato sauce	138.49±4.88 ^{c}	14.28±1.02 ^{a}	46.90±1.01 ^{c}	06.23±0.81 ^{c}
	Rice + djoumglé sauce	148.20±3.22 ^{e}	14.93±0.95 ^{a}	47.95±1.15 ^{c}	06.23±0.52 ^{c}
	Rice + leaf sauce	135.95±3.72 ^{c}	14.87±1.02 ^{a}	46.62±1.55 ^{c}	05.04±0.52 ^{b}
	Rice + salad	70.53±1.27 ^{a}	16.37±1.35 ^{b}	50.08±1.95 ^{d}	03.92±0.07 ^{a}
	Attiéké + *Kedjenou*	122.10±2.65 ^{b}	16.81±1.01 ^{b}	52.68±2.01^{d}	05.86±0.62 ^{c}
	Attiéké + light sauce	136.20±1.29 ^{c}	17.20±1.05 ^{bc}	46.45±0.99 ^{c}	06.11±0.11 ^{c}
	Yam + vegetable paste	79.21±0.59 ^{a}	18.92±2.15 ^{c}	49.75±1.11 ^{c}	13.10±1.05 ^{e}
	Placali + fresh okra sauce	252.36±6.25 ^{f}	27.15±3.75 ^{d}	20.15±1.99 ^{a}	02.15±0.32 ^{a}
	Toh + fresh okra sauce	217.96±4.05 ^{f}	27.49±3.01 ^{d}	38.21±2.09 ^{b}	12.76±1.79 ^{e}
DINNER	Peas	68.42±1.51 ^{e}	15.07±0.85 ^{b}	31.60±1.01 ^{d}	10.02±0.78 ^{c}
	White beans	180.18±3.05 ^{f}	16.79±1.13 ^{c}	71.53±2.21 ^{e}	31.86±1.06 ^{e}
	Vegetable planter	37.82±0.85 ^{a}	14.86±1.45 ^{b}	20.83±0.94 ^{b}	05.71±0.01 ^{a}
	Soy	58.11±0.15 ^{d}	27.73±2.07 ^{d}	39.84±1.07 ^{d}	11.63±1.44 ^{d}
	Lawyer	42.32±1.75 ^{b}	38.89±1.06 ^{e}	14.02±0.76 ^{a}	11.61±0.91 ^{d}
	Green beans	42.32±0.95 ^{b}	38.89±2.19 ^{e}	14.02±0.81 ^{a}	07.96±0.89 ^{b}
	Macedonia	52.81±2.05 ^{c}	07.66±0.09 ^{a}	18.78±1.04 ^{a}	09.36±0.99 ^{c}
	Vegetable stir-fry	52.11±0.25 ^{c}	14.08±0.75 ^{b}	25.59±0.51 ^{c}	10.51±0.35 ^{cd}

Values are the means ± standard deviations of three measurements (n = 3). The same letter written as a subscript in the same column for the same type of meal (breakfast, lunch, dinner) indicates that there is no significant difference at the 5% threshold between the samples for the parameter concerned.

Table 6. Interactions between some patient characteristics and the evolution of blood sugar levels

			Evolution of blood sugar			
			Drop	Stable	Increase	*P*
Age (year)	[18 ; 40[	*n = 02*	50%	50%	0%	*0,518*
	[40 ; 65]	*n =18*	55%	33%	12%	
	Over 65 years old	*n = 17*	06%	88%	06%	
Sex	Male	*n = 21*	38%	19%	43%	*0,734*
	Female	*n = 16*	31%	19%	50%	
Type of traitment	Oral antidiabetics	*n = 13*	38%	38%	24%	*0,811*
	Insulin	*n = 15*	40%	40%	20%	
	ADO + insulin	*n = 04*	0%	100%	0%	
	Diet	*n = 05*	100%	0%	0%	
Duration of discovery of diabetes	Less than 6 months	*n = 05*	50%	50%	0%	***0,021***
	[6 months ; 2 years]	*n = 05*	33%	37%	30%	
	More than 2 years	*n = 27*	20%	46%	34%	
Complications	Yes	*n = 32*	25%	41%	34%	***0,004***
	No	*n = 05*	80%	20%	0%	
Origin of food consumed	Only of CHU	*n = 10*	30%	40%	30%	*0,624*
	Other source	*n = 27*	41%	26%	33%	
Blood glucose at entry (g/L)	Less than 0,70	*n = 09*	33%	44%	23%	*0,741*
	[0,70, 1,40[	*n = 03*	66%	44%	0%	
	[1,40, 2[	*n = 05*	0%	75%	25%	
	[2, 4 [	*n = 11*	30%	40%	30%	
	More than 4	*n = 09*	57%	29%	14%	

3.2. Discussion

The general objective of this work was to characterize the diet served to diabetic patients hospitalized at the Angré University Hospital. The profile of the patients (socioeconomic, demographic and diabetic disease characteristics) then the foods served at breakfast, lunch and dinner by the catering service of the Angré University Hospital were analyzed. The interactions between some social characteristics, the patients' diet and the evolution of the patients' blood sugar levels the next day were studied.

In terms of patient profile, the results showed that most patients were over 40 years old (94.60%) with an average age of 52.5 years. These data are in agreement with those reported by [8,9] who found from their study, an average age of diabetes of 51.27 years.

The study also showed a male predominance (56.76%) with a sex ratio of 1.31. This result could be explained by the proportion of men within the national population which was estimated at 51.7% after the general population and housing census carried out in Côte d'Ivoire in 2014 [10]. Conversely, the respective studies of [11] in Ivory Coast and [12] in Senegal reported a female predominance within populations affected by diabetes.

Most patients were hospitalized either after hypoglycemia (24.32%) or after hyperglycemia (45.95%). These results agree with those of [13] who found that the incidence of severe hypoglycemia among the different trials varied between 5% and 28% depending on the intensity of glycemic control in the intensive care unit. The rates of hyperglycemia encountered in the present study are lower than those found by [14] who reported in

their observational studies, a prevalence of hyperglycemia ranging from 38% to 40% in hospitalized diabetic patients.

Several patients (67.54%) were diabetics known for more than 2 years and mainly had chronic complications (high blood pressure, stroke, heart failure). Our results agree with those of the study by [15] carried out in Tunisia, which reported a total of 66.7% of diabetic patients living with chronic complications. In the literature, several studies have also shown that approximately 40% of patients were hypertensive when they discovered their type 2 diabetes [16]. Also, hyperglycemia often encountered in patients induces an increased risk of cardiovascular diseases through several mechanisms, including insulin resistance, inflammation, endothelial dysfunction and the toxic effects of glucose on the micro-vascularization [17]. This can lead to a risk of stroke as shown in the present study with a magnitude of 08.11% of patients affected. Among older diabetics (51-69 years), the prevalence of coronary artery disease was between 12 and 31.7% according to [18,19], which explains the result of this study with a prevalence rate of 08.10%.

In terms of food consumed by patients, the majority (3/4) did not exclusively consume meals offered by the CHU catering service. This is contrary to the results of [20] which showed that the hospital catering offer is that exclusively consumed by patients, even if at times, it can be deficient in calories and proteins and therefore lead to undernutrition especially among patients. Elderly hospitalized patients. The meals offered were varied, diversified and mainly consisted of liquid or semi-liquid foods for breakfast, typical Ivorian dishes for lunch, and vegetables and legumes for dinner. The proportions of carbohydrates served at meals during the day are also close to those recommended by [21] which are between 225 and 250 g. For dinner, the vegetables and legumes offered are very beneficial to patients because they provide fiber, essential for balancing their blood sugar levels. A recent review of the literature showed that a fiber intake of between 4 and 19 g per day improved blood sugar levels and reduced cardiovascular risks in type 2 diabetics [16,22].

The average quantities served were mostly normal for carbohydrates, fats, proteins and sufficient for fiber. Indeed, for an adult, with daily needs of around 2800 Kcal, the average recommended quantity of carbohydrates is between 85 and 100g at breakfast, 120 and 140g at lunch and dinner. The average recommended quantities of lipids are between 20 and 25g for breakfast, 30 and 35g for lunch and dinner. Those in protein range between 20 and 21g at breakfast, 30 and 35g at lunch and dinner. The quantities served being close to those recommended, this contributes to satisfying the nutrient needs of patients in quantity and quality [23].

At the level of interactions between some characteristics (socio-economic, demographic and diet) of patients and the evolution of blood sugar the next day, the results showed that only the duration of discovery of diabetes and the occurrence of complications had an influence. on the evolution of blood sugar levels the next day. According to certain works by [24], one of the methods recommended to avoid the rapid occurrence of complications is early detection and treatment of the disease.

4. Conclusion

The meals offered by the Angré University Hospital catering service were varied, diverse and served in recommended quantities. Consumption of vegetables and legumes at dinner, rich in dietary fiber, is advantageous because they greatly help to better balance patients' blood sugar levels the next day. However, the longer the diabetes is old and the complications appear, the more effort it takes to control blood sugar levels the next day. Compliance with medication and dietary prescriptions must therefore be encouraged to delay the onset of complications.

References

[1] FID (2019). Atlas du Diabète de la FID. 9e Edition, Bruxelles, Belgique. 176p.

[2] ADA. (2014). Diagnosis and classification of diabetes mellitus. *Diabetes Care*, 37(1): 11-61.

[3] FID (2021). Atlas du Diabète de la FID, 10e Edition, Bruxelles, Belgique. 138p.

[4] Koudou G. H. A. (2017). Facteurs de risque du diabète dans la population non diabétique de la région du sud-comoé (Côte d'Ivoire) : cas des villes d'Aboisso et de Bonoua. Thèse d'Etat pharmacie, Université Félix Houphouët-Boigny, Abidjan, Côte d'Ivoire. 116p.

[5] FID (2019). Atlas du Diabète de la FID. 9e Edition, Bruxelles, Belgique. 176p.

[6] Okoubo G., Ekra K. D., Orsot T. et Ekou F. K. (2022). Prevalence and factors associated with diabetes in Côte d'Ivoire: a cross-sectional study in the country's adult population. *International journal of Tropical Disease & Heath*, 43(6): 12-40.

[7] Khazrai Y. M., Defeudis G. et Pozzilli P. (2014). Effect of diet on type 2 diabetes mellitus. *Diabetes metabolism Res review*, 1: 24-33.

[8] Raherison R. E., Ramilitiana B., Raharinavalona S. A. et Rakotomalala D. P. (2015). Les nouveaux diabétiques observés à l'Hôpital Joseph Raseta Befelatanana d'Antananarivo (2002-2003). *Revue Médicale Madagascar*, 5(1): 526-530.

[9] Komi D. N., Lihanimpo D., Kodjo A. D., Toyi T., Yawovi M. T. et Abago B. (2019). Les modes de révélation du diabète sucré au CHU Sylvanus Olympio de Lomé. *The Pan African medical journal*, 34 : 99-102.

[10] RGPH (Recensement Général de la Population et de l'Habitat) (2014). Principaux résultats préliminaires. Secrétariat Technique Permanent du Comité Technique du RGPH. P 1 – 23.

[11] Sibally P. L. (1998). Contribution à l'étude des complications du diabète sucré en Côte d'Ivoire : Etude transversale de 300 patients. Thèse en Médecine, Université Félix Houphoët-Boigny, Abidjan, Côte d'Ivoire. 350p.

[12] Sidibé E. H. (2007). Le diabète ancien en Afrique et idées récentes sur les produits finaux de la glycation avancée (A propos de 39 cas dakarois). *Cahiers Santé*, 17: 23-27.

[13] Krikorian A., Ismail-Beigi F., Moghissi E. S. (2010). Comparisons of different insulin infusion protocols: a review of recent literature. *Current Opinion in Clinical Nutrition et Metabolic Care*, 13: 198–204. [PubMed].

[14] Umpierrez G. E., Isaacs S.D., Bazargan N., You X., Thaler L. M. et Kitabchi A. E. (2002). Hyperglycemia: An independent marker of in-hospital mortality in patients with undiagnosed diabetes. *Journal of Clinical Endocrinology Metabolism*, 87: 978–982. [PubMed].

[15] Nibouche W. N. et Biad A. (2016). Hypertension artérielle au moment du diagnostic du diabète de type 2 de l'adulte. *Annales de cardiologie et Angéologie*, 65(3): 152-158.

[16] Wheeler M. L., Dunbar S. A., Jaacks L. M., Karmally W., Mayer-Davis E. J., Wylie-Rosett J., Yancy J. W. S. (2012). Macronutrients, food groups, and eating patterns in the management of diabetes: a systematic review of the literature. *Diabetes care*, 35(2): 434-445.

[17] Paneni F, Beckman J. A., Creager M. A, Cosentino F. (2013). Diabetes and vascular disease: pathophysiology, clinical consequences, and medical therapy. *Eur Heart Journal*, 34(31): 2436–2443.

[18] Koivisto V.A., Stevens L.K., Mattock M., Ebeling P., Muggeo M. et Stephenson J. (1996). Cardiovascular disease and its risk factors in IDDM in Europe. *Diabetes Care*, 19: 689–697.

[19] Eeg-Olofsson K., Cederholm J., Nilsson P. M., Zethelius B.,Svensson A.-M., Gudbjörnsdóttir S. et Eliasson B. (2010). News aspects of HbA1c as a risk factor for cardiovascular diseases in type 2 diabetes: an observational study from the Swedish National Diabetes Register (NDR). *Journal International Medical*, 26(8): 471–82.

[20] André Petit, Muriel Horlaville, Marie-Claude Carpentier, Pierre Déchelotte, (2004). La prise alimentaire des patients hospitalisés : constats et pistes. *Nutrition Clinique et Métabolisme*. Volume 18, Issue 1, Pages 36-42.

[21] PNNMN (2017). Guide national de recettes : A Base d'Aliments Locaux pour la Prise en Charge Nutritionnelle des Adolescents et Adultes. Disponible GUIDE CdI-Adulte-Recipe-Book-Jul2017.pdf, 132p.

[22] Fujii H., Iwae M., Ohkuma T., Ogata-Kaizu S., Ide H., Kikuchi Y., Idewaki Y., Joudai T., Hirakawa Y., Uchida K., Sasaki S., Nakamura U. et Kitazono T. (2013). Impact of dietary fiber intake on glycemic control, cardiovascular risk factors and chronic kidney disease in Japanese patients with type 2 diabetes mellitus: the Fukuoka Diabetes Registry. *Nutrition journal*, 11(12): 1475-2891.

[23] Piquet Camille, 2023. Measures hygiéno-diététiques dans le diabète et freins à leur adhesion. Sciences direct. Volume 62, Issue 622, Pages 25-27.

[24] William H. H., Ye W., Griffin S. J., Simmons R. K., Davies M. J., Khunti K., Rutten G. E. H. M., Sandbaek A., Lauritzen T., Borch-Johnsen K., Morton B Brown M. B. et Wareham J. N. (2015). Early Detection and Treatment of Type 2 Diabetes Reduce Cardiovascular Morbidity and Mortality: A Simulation of the Results of the Anglo-Danish-Dutch Study of Intensive Treatment in People With Screen-Detected Diabetes in Primary Care (ADDITION-Europe). *Diabetes care*, 38(8):1449-1455.