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Epidemiological and Clinical Aspect of Diabetes Mellitus at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes, Mali

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Abstract **Original Research Article**

Diabetes mellitus is a chronic endocrine disorder characterized by the presence of hyperglycemia due to relative or absolute insulin deficiency. Objective: To describe the epidemiological and clinical aspects of diabetes mellitus in the internal medicine unit of the Fousseyni Daou Hospital in Kayes. ***Methodology***: This was a descriptive and cross-sectional study with retrospective data collection that took place from January 1 to December 31, 2019 at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. It covered all diabetic patients hospitalized or presenting in consultation during the study period**.** ***Results***: We identified 406 diabetic patients out of 2066 patients admitted to the unit, i.e. a hospital prevalence of 19.65%. Of these 406 diabetics, 105 (25.86%) were hospitalized in our unit. The age group 50 to 59 years was the most represented, 110 cases (27.10%) with an average age of 53.26 +/- 9.69 years, the female sex predominated, 251 cases (61.82%) with a sex ratio of 1.61. The Soninke ethnic group was the most represented, 91 cases (25.65%), housewives represented 192 cases (47.29%). Of 302 patients of known marital status, 207 (68.87%) were married. The majority of patients resided in the city of Kayes 268 (66.01%). The age of discovery of diabetes was more notified between 40 and 49 years (238 patients) or 58.62% with an average age of discovery of 50.75 years. The circumstances of discovery were noted in 323 patients which are among others: Polyuropolydipsia syndrome in 191 cases (59.13%), ophthalmological check-ups in 67 cases (20.74%), pre-operative check-ups 43 cases (13.31%), obesity check-ups 9 cases (2.72%), prenatal check-ups 5 cases (1.54%), acute complications 11 cases (3.40%). Diabetes had been evolving for more than 5 years in 127 patients (31.28%), diabetes of recent discovery 90 cases (22.16%). High blood pressure was the most common medical history in 96 cases (48.97%). The use of hyperglycemic drugs was dominated by the use of diuretics 19 cases (41.30%), estrogen-progesterone 17 cases (36.95%). The most common surgical history was cataractectomy 11 cases (36.66%). Gynaecological-obstetric antecedents were dominated by abortions, stillbirths, macrosomia, caesarean section respectively 11 cases (40.74%), 9 cases (33.33%), 7 cases (18.91%), 9 cases (30%). The history of family diabetes was observed in type 2 diabetics (99 cases) or 95.19%. Obesity was notified in 70 patients of which women were more represented 57 cases (81.43%), the age group of 40-59 years had more weight in 73 cases (91.25). Type 2 was the most important diabetes group in 390 (96.05%), 5 were type 1. Gestational diabetes was present in 3 women not known to have diabetes. Abnormalities were found during the performance of complementary examinations among others: LDLc 123 cases (34.45%), hypercreatinemia 35 cases (9.28%), microalbuminuria 23 cases (7.64%). ***Conclusion***: Diabetes constitutes a group of different diseases but characterized by an excess of sugar in the blood and must be taken seriously and treated effectively.

Keywords: Diabetes mellitus, epidemiology, clinic, internal medicine, Fousseyni Daou hospital, Kayes, Mali.

INTRODUCTION

Diabetes is a metabolic disease that results in chronic hyperglycemia, which eventually leads to severe and disabling micro and macro vascular complications. [1].

In 2015, the International Diabetes Federation (IDF) estimated that 415 million people had diabetes worldwide. If nothing is done by 2040, it is expected to reach 642 million people with diabetes. Diabetes is responsible for one death every 7 seconds [1].

In Europe, the number of diabetics was estimated at 59.8 million people in 2015 and 71.1 million are expected in 2040 according to IDF [1].

In Africa, the number of diabetics was estimated at 14.2 million people in 2015 and 34.2 million are expected in 2040 [1].

In Mali, the prevalence of diabetes was estimated at 9.3% in 2015 [2]. Type 2 diabetes was estimated at 3.3% according to the Non-Governmental Organization (NGO) Santé-Diabète [3].

Thus, in Kayes, the first administrative region of Mali, no study has been done on the epidemiological and clinical aspect of diabetes mellitus. We have therefore carried out this work in order to describe these different aspects to contribute to the improvement of the management of diabetics and to a better knowledge of the disease in the region of Kayes.

METHODOLOGY

This was a descriptive and cross-sectional study with retrospective data collection that took place from January 1 to December 31, 2019 at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. It included all diabetic patients who were hospitalized or presented for consultation in the Internal Medicine Unit of the hospital during the study period.

Non-diabetic patients were excluded from the study.

Operational definitions:

- Diabetics: subjects with symptoms of diabetes (polyuria, polydipsia, unexplained weight loss) and a random blood glucose level ≥ 11.1 mmol/l (2.00 g/l) or fasting blood glucose level (no caloric intake for at least 8 h) is ≥ 7.0 mmol/l (1.26 g/l) or blood glucose level is ≥ 11.1 mmol/l (2.00 g/l) two hours after ingestion of glucose (75 g) during an OGTT.
- Among these diabetics type 1 and type 2 were selected according to the following clinical criteria:
- *Type 1: Young subject, rapid and acute onset, lean, familial character of relatives with infrequent diabetes.
- *Type 2: Adult, most often insidious onset, frequent obesity, family character of parents with frequent diabetes, history of macrosomia in women.
- *Gestational diabetes: hyperglycemia of variable severity, beginning or first diagnosed during pregnancy.
- Glycated hemoglobin A1 (HbA1c): we considered any value of HbA1c ≤ 7% as good diabetes control.
- Triglycerides: any value above 1.5g/l was considered hypertriglyceridemia
- LDLc (low-density lipoprotein cholesterol): we considered as hyperLDLemia any LDLc value greater than or equal to 1g /l
- HDLc (high-density lipoprotein cholesterol): any HDLc value lower than 0.4 g /l in men and 0.5g/l in women was considered as hypoHDLemia.
- Creatinine levels between 6 and 14 mg/L were considered normal.
- microalbuminuria: albuminuria between 30 and 300 mg/24h.

Data were collected on pre-designed survey forms, entered into Microsoft Word 2007 and Excel 2013, and analyzed using Epi Info software. Informed consent with the patient or accompanying person was obtained.

RESULTS

We identified 406 diabetic patients out of a total of 2066 patients admitted to the Unit, i.e. a hospital prevalence of 19.65%.

Among these 406 diabetics, 105 (25.86%) were hospitalized in our unit.

The age group of 50 to 59 years was the most represented in 110 cases (27.10%) (see Table 1) with an average age of 53.26 +/- 9.69 years. Females were predominant, 251 cases (61.82%) with a sex ratio of 1.61. The Soninke ethnic group was the most represented in 91 cases (25.65%) (see Table 2). Housewives were the most important occupational group with 192 cases (47.29%).

Diabetes was discovered in the maximum number of patients between 40 and 49 years of age (238 patients), i.e. 58.62% (see Table 3) with an average age of discovery of 50.75 years. The circumstances of discovery were reported in 323 patients (see Table 4), including: poyuropolydipsia syndrome in 191 cases (59.13%), ophthalmological check-ups in 67 cases (20.74%), pre-operative check-ups in 43 cases (13.31%), obesity check-ups in 9 cases (2.72%), prenatal check-ups in 5 cases (1.54%), acute complications in 11 cases (3.40%). One hundred and twenty-seven patients (31.28%) had chronic hyperglycemia for more than 5 years and 90 cases (22.16%) were newly diagnosed (see Table 5). High blood pressure was the most common medical history, 96 cases (48.97%).

The use of hyperglycemic drugs was dominated by the use of diuretics in 19 cases (41.30%) followed by estrogen-progestin 17 cases (36.95%). Caesarean section, abortions, stillbirths, macrosomia were the most frequent gynecological-obstetric antecedents respectively 9 cases (30%), 11 cases (40.74%), 9 cases (33.33%), 7 cases (18.91%) (Cf. Table 6). The history of family diabetes was observed in type 2 diabetics (99 cases), i.e. 95.19% (see Table 7).

Obesity was reported in 70 patients among whom women were more represented, 57 cases (81.43%) and the age group of 40-59 years was the most represented, 73 cases (91.25%).

Type 2 diabetes represented 390 cases (96.05%). Out of 406 diabetics, only 4 or 5 were type 1 (see Table 8). Gestational diabetes was found in 3 women.

Abnormalities were noted during the course of complementary examinations, among others: HyperLDLemia 123 cases (34.45%), hypoHDLemia 43 cases (13.16%), hypercreatinemia 35 cases (9.28%), microalbuminuria 23 cases (7.64%) (see Table 9).

Table 1: Age distribution of patients

Age range	Workforce	percentage
< 19	4	0,98
20 – 29	9	2,21
30 – 39	25	6,15
40 – 49	98	24,13
50 – 59	**110**	**27,10**
60 – 69	**97**	**23,9**
70 – 79	59	14,53
> 80	4	0,98
Total	406	100

Table 2: Distribution of patients by ethnicity

Ethnicity	Workforce	percentage
Soninké	91	25,65
Bambara	87	21,46
Peuhl	89	21,46
Malinké	66	11,51
Khassonké	36	9,42
Sonrhai	11	3,66
Kakolo	6	2,61
Maure	3	1,04
Senoufo	6	1,04
Mossi	2	1,04
Wolof	3	1,04
Bozo	1	0,52
Mianka	1	0,52
Dogon	3	0,52
Total	406	101

Table 3: Distribution of patients by age of diabetes onset

Age of discovery	Workforce	percentage
< 19	4	0,98
20 – 29	1	0,24
30 – 39	8	1,97
40 – 49	238	58,62
50 – 59	139	34,23
60 – 69	11	2,70
70 – 79	3	0,73
> 80	2	0,49
Total	406	100

Table 4: Circumstances of discovery of diabetes

Circumstances of discovery	Workforce	percentage
Polyuropolydipsia syndrome	191	59,13
Ophthalmologic assessment	67	20,74
Pre-operative assessment	43	13,31
Prenatal check-up	5	1,54
Obesity assessment	9	2,72
Acute complication	11	3,40
Total	323	100

Table 5: Distribution of patients by duration of diabetes progression

Duration of evolution (years)	Workforce	percentage
<1	90	22,16
1 à 5	187	46,05
6 à 10	87	21,42
11 à 15	26	6,40
16 à 20	9	2,21
21 à 25	5	1,23
Total	406	100

Table 6: Distribution of patients according to gyneco-obstetrical history

Gyneco-obstetrical history	Workforce	percentage
Abortion	11	40,74
Stillborn	9	33,33
Macrosomia	7	18,91
Total	27	100

Table 7: Distribution of patients according to family history of diabetes

Type of diabetes	family history of diabetes	
	Workforce	percentage
Diabetes 1	3	2,88
Diabetes 2	99	95,19
MODY	2	1,92
Gestational	0	0
Total	104	100

Table 8: Distribution of Patients by Type of Diabetes

Type Diabetes	Workforce	percentage
Type 1	5	1,23
Type 2	390	96,05
MODY	8	1,97
Gestational	3	0,73
Total	406	100

Table 9: Distribution of patients by paraclinical workup

Paraclinical	Normal		Anomaly		Total
	Workforce	percentage	Workforce	percentage	
Pancreatic ultrasound (pancreatopathy)	5	100	-	-	5
Abdomen without preparation (ASP)	-	-	-	-	-
Abdominal CT scan	-	-	-	-	-
Uric acid	156	64,19	87	**35,80**	243
Total cholesterol	210	58,82	147	**41,17**	357
HDLc	310	86,83	47	13,16	357
LDLc	234	65,54	123	**34,45**	357
triglyceridemia	343	9,60	14	**3,92**	357
hypercreatininemia	342	95,79	35	9,28	377
Micro albuminuria	278	92,35	23	7,64	301

DISCUSSION

In our series, we found a hospital prevalence of 19.65%. Authors such as Mamadou Diaga. M [4] had found 8.15%, DJROLO. F [5] 1.7% for the sedentary population against 0.9% for physically active subjects, STEYN K [6] 7.6% in the whole control group against 4% in all non-African patients.

This high frequency can be explained by the increase in the population, the change in culinary habits and the development of means of screening for diabetes. The age group 50 to 59 years was more represented 27.10% with an average age of 53.26 +/- 9.69 years. Mamadou Diaga. M [4] found the same high frequency in the same age group at 33% with an average age of 49.73 +/- 12.75. DEMBELE M et al. [7] had found the mean age to be 55.7 + 12.2 years.

The existence of the number of cases of diabetes after 60 years could be explained by a better follow-up of diabetics and the increase in life expectancy in our countries.

We noted a predominance of the female sex with 61.82%, Mariko M. [8] had found 61.9%.

The Soninké ethnic group was the most represented at 25.65%. This predominance of the Soninké could be explained by the high density of this ethnic group in the Kayes region, their higher attendance at health centers due to their economic capacity, and consanguineous marriage, which is a factor in the development of type 2 diabetes in their families.

Housewives constituted the largest occupational group 47.29%. Kamissoko. K. F [9], kone. O [10] found the same predominance of this occupation respectively 41.2%; 45.5%.

Diabetes was discovered in the maximum number of patients between 40 and 49 years of age, i.e. 58.62% with an average age of discovery of 50.75 years. A. S. S. OGA *et al*., [11] found an average age of discovery of 49.34 +/- 12.69 years.

The circumstances of discovery were reported in 323 patients among whom Polyuropolydipsia syndrome was the most frequent mode of discovery 59.13%. These same observations were made by Kamissoko. K. F [9], Sangaré S. [12] and Drago A [13] who, in their studies, found 57.5%, 59.5% and 50% respectively.

Diabetes had been evolving for more than 5 years in 31.28%. Kamissoko. K. F [9] found 43.7%.

High blood pressure was the most common medical history in 96 cases (48.97%). This finding was made by several authors such as Guindo Issa [14], Dibia G.O. *et al*., [15], Coulibaly D. *et al*., [16] who found respectively a frequency of 71.3%, 71.77%, 71.6% and 62.66% of diabetics with hypertension In the UKPDS [17] (UK Prospective Diabetes Study), 39% of newly diagnosed diabetic subjects were hypertensive. This reflects the frequent association of diabetes and hypertension.

The use of hyperglycemic drugs was dominated by the use of diuretics 41.30% followed by estrogen/progestin 36.95%. In their study, Leila Chebane *et al*., [18] pointed out that the drug classes most frequently found in BNPV [according to the ATC (Anatomical Therapeutic Chemical) classification] to cause hyperglycemia were antiretrovirals, steroidal anti-inflammatory drugs, second generation neuroleptics, immunosuppressants and diuretics.

History of fetal macrosomia for women was noted in 18.91%. Kamissoko. K. F [9] had found 38.7%.

The history of familial diabetes was observed in 95.19% of type 2 diabetics. Authors like Kamissoko. K. F [9], Mamadou Diaga. M [4], A. S. S. OGA and Coll [11] had respectively found 61.2%; 46%; 39.0% of familial diabetes.

Obesity was reported in 70 patients among whom women were more represented (81.43%) and the age group 40-59 years represented 91.25%. In the ENTRED cohort [19], overweight ($25 \geq BMI < 30$ kg/m²) was observed in 39% of type 2 diabetics; obesity ($BMI \geq 30$ kg/m²) was observed in 41% of type 2 diabetics. Konaté *et al*., [20] found obesity in 56.3%. In the light of these results, we can state that the obesity/diabetes association is frequent.

Type 2 diabetes was the most frequent diabetes group in 96.05%. Authors like Kone. O [10], Mamadou Diaga. M [4] found 66.7%; 97% respectively. Gestational diabetes was present in 3 women not known to have diabetes (0.73%). Monnier L, Colette C. [21] reported 2.5% of gestational diabetes.

Abnormalities were found during the performance of complementary examinations among others: LDLc 34.45%, HDLc 13.16%, hypercreatinemia 9.28%, microalbuminuria 7.64%, these results can be compared with those of other authors:

	Other Authors				
Our Study	Diaga. M [4]	Guira *et al*., [22]	Habib B.A. *et al*., [23]	Blaise A [24]	DEMBELE M et Col [7]
LDLc (34,45%)	67%	29,1%	-	-	-
HDLc (13,16%)	15%	-	51,3%		-
hypercreatininemia (9,28%)		-	-	37,2%	-
Microalbuminuria (7,64%)	7%	-	-	-	41,7%

CONCLUSION

Diabetes is common in the Kayes region. The classic functional symptomatology is most often the mode of discovery of diabetes. The need for early detection is essential through widespread awareness and information of the population.

Conflict of interest: None

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