Int.J.Curr.Microbiol.App.Sci (2018) *7*(12): 3276-3282

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 7 Number 12 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.712.379

Frequency of Lipid Balances and Prevalence of Dyslipidemies in the Biochemistry Laboratory of the Marc Sankale Center of Dakar

Sow Djiby[1*], A. Ndiaye[2], Insa Diaw Fall[2], Sokhna Fall AW[2], Diédhiou Demba[1], Ndour Michel Assane[1], Diallo Ibrahima Mané[1], Sarr Anna[1], Diop Saïd Norou[1], Ndour-Mbaye Maimouna[1] and Niama Diop Sall[2,3]

[1]Marc Sankale center, Abass NDAO Hospital in Dakar, internal medicine service (Senegal)
[2]Laboratory analyzes Medical Biology, Abass NDAO hospital in Dakar (Senegal)
[3]Faculty of Medicine, Pharmacy and Dentistry (FMPOS) in Dakar, Medical Biochemistry Laboratory, Senegal

**Corresponding author*

Keywords

Diabetes, dyslipidemia, prevalence, Senegal

Article Info

Accepted:
24 October 2018
Available Online:
10 December 2018

A B S T R A C T

Diabetes mellitus associated with dyslipidemia raises the risk of complications that contribute significantly to cardiovascular morbidity and mortality. The objective was to describe the frequency and prevalence of dyslipidemia in diabetics to better plan follow-up. This was a cross-sectional, descriptive study conducted from January 1st, 2016 to December 31st, 2016 at the Marc Sankale diabetes biochemistry laboratory in Dakar. The data collected in the registry were epidemiological, study of diabetes mellitus and cardiovascular risk factors. Included in the study were all patients with at least one lipid status parameter whose results were recorded in the biochemistry laboratory register. In our study population 19.52% of patients had at least one lipid parameter in their biochemical record. The prevalence of dyslipidemia in our study population was 59.5%. The prevalence of hypercholesterolemia, low HDL cholesterol, high LDL cholesterol, hypertriglyceridemia and mixed hyperlipidemia were respectively: 52.92%; 5.63%; 43.56%; 2.48%; 2.04%. The average age of the patients was 55.83 years. The subjects aged 40 to 59 seemed to be more exposed and there was a female predominance. Diabetes is unbalanced at 52.08%. Our work reports a high prevalence of dyslipidemia in diabetics. However, it requires strengthening prevention strategies through appropriate therapeutic education and optimal balance of diabetes mellitus.

Introduction

Diabetes is a public health problem and according to the 2017 estimates of the (International Diabetes Federation, 2017), the number of diabetics in the world is 425 million. Diabetes mellitus is a risk factor for cardiovascular disease and the 13th leading cause of death in the world (World Health Organization, 2015). It is associated with a high incidence of dyslipidemia constituting a factor aggravating atheromatous risk in this population (Fasanmade *et al.,* 2013; Mithal *et al.,* 2014). The goal of cardiovascular disease

prevention is to reduce the risk associated with each of these factors. The lipid balance is thus one of the elements of the first step of the cardiovascular disease prevention strategy. The aim of this study was to evaluate the frequency of lipid balances and the prevalence of dyslipidemia in patients received at the biochemistry laboratory of the Marc Sankale Diabetic Center in Dakar.

Materials and Methods

This was a descriptive cross-sectional study carried out at the Dakar Diabetes Center Marc Sankale from January to December 2016. It concerned diabetic patients of all types whose results were included in the laboratory register and were included in the study that is the number of lipid parameters required. Non-included diabetic subjects not included in the center register.

For this survey, we selected the following variables:

Sociodemographic characteristics: sex, age grouped by slice

The biochemical parameters identified were: fasting glucose; glycated hemoglobin; lipid status parameters such as total cholesterol, HDL-cholesterol, LDL cholesterol and triglycerides, uricemia, creatinine.

Judgment criteria

The dyslipidemias were defined in this study according to the criteria of NCEP (The National Cholesterol Education Program) (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001):

Pure hypercholesterolemia: total cholesterol greater than 2 g / L and triglycerides less than <1.5 g / L.

Low HDL cholesterol levels: HDL less than 0.4 g / L.

Mixed hyperlipidemia: total cholesterol greater than 2 g / l and triglycerides higher than 1.5 g / l.

Hypertriglyceridemia: total cholesterol lower than (2 g / l) and triglycerides greater than 1.5 g / l.

High LDL cholesterol: LDL cholesterol> 1.3g / l

The data has been verified, evaluated and validated, and entered using the Google Docs and Microsoft Excel software.

Results and Discussion

Sociodemographic characteristics

We included 3503 diabetic subjects during the study period. In our 684-study population19, 52% of patients had at least one lipid parameter in their biochemical record. Table 1 shows the socio-demographic characteristics of the population at inclusion. The distribution of patients according to the number of lipid parameters per balance sheet (Table 2) revealed that 93.12% of prescriptions had four parameters, namely total cholesterol, triglycerides, LDL and HDL cholesterol. The prescription frequencies of lipid parameters show a demand for total cholesterol alone in (4.09%) by the prescribers.

No lipid assessment request included the three parameters of total cholesterol, triglycerides and HDL cholesterol. The prevalence of dyslipidemia observed in our sample was 51.75%. Hypercholesterolemia (52.92%), increased LDL (43.56%) and decreased HDL-cholesterol (5.63%) were the most common hypertriglyceridemia and mixed dyslipidemia respectively 2.48 % and 2.04% (Table 3).

Table.1 Epidemiological and clinical profile of patients at baseline

Epidemiological and clinical characteristics	
Number of cases	3503
Lipid balance	684(19,52%)
Women	2551(72,86) %
Sex ratio (M/W)	0,37
Average age	55,23 ans
Patients <25 years old	3,81%
Patients >45 years old	73,07%
Average balance of glycemia	1,59
Glucose> 2 g/l	21,60%
Average glycated hemoglobin	8,17%
Glycated Hemoglobin> 7%	53,55%
Creatinine>13 mg/l	8,99%

Table.2 The distribution of patients according to the number of lipid parameters by balance sheet

Number of parameters	Lipid balance	Number	Percentage
1 parameter	CT	28	4,09%
	TG	0	0%
2 parameters	CT,TG	7	0,29%
	CT, HDL	2	1,16%
	TG, HDL	0	0%
3 parameters	CT,HDL,LDL	8	1,16%
	HDL,LDL,TG	2	0,29%
4 parameters	CT, HDL, LDL, TG	637	93,12%
Total		684	100%

CT = Total Cholesterol
TG= Triglycerides
LDL= LDL cholesterol
HDL=HDL cholesterol

Table.3 Patient dyslipidemia profile

Characteristics of dyslipidemia	
Profile	Number (Percentage)
Isolated hypercholesterolemia	362 (52,92%)
Hypertriglyceridemia	17 (2,48%)
Isolated Low HDL cholesterol	36 (5,63%)
High LDL cholesterol	298 (43,56%)
Mixed dyslipidemia	14 (2,04%)

Table.4 Epidemiological and clinical profile of patients according to dyslipidemia

Epidemiological and clinical characteristics according to dyslipidemia		
	Dyslipidemia YES	Dyslipidemia NO
Number of cases	407	277
women	316(77,45%)	248(74,92%)
Sex ratio (M/W)	0,28	0,33
Average age	55,83 years	53,04 years
Patients < 40 years old	28(6,87%)	46(13,89%)
Patients of age (40-59) years	227(55,77%)	183(55,28%)
Patients >60 years old	152(37,34%)	101(30,51%)
Average balance of glycemia	1,6	1,56
Glucose >2g/d	100(24,57%)	66(20,56%)
Average glycated hemoglobin	8,34%	7,94%
Glycated Hemoglobin> 7%	212(52,08%)	163(53,26%)
Creatinine>13 mg/l	20(4,91%)	20(10,10%)

Table.5 Distribution of dyslipidemia by sex

Characteristics of patients			
	MEN	WOMEN	Total
Number of cases	91	316	407
Average age	55,32 years	55,98years	55,23
Average balance of glycemia	1,70	1,65	1,59
Average glycated hemoglobin	8,51%	8,29%	8,17%
Hypercholesterolemia	76(46,06%)	286(55,31%)	362
Hypertriglyceridemia	6(3,82%)	11(224%)	17
Low HDL cholesterol	18(11,84%)	18(3,62%)	36
High LDL cholesterol	70(45,75%)	228(46,15%)	298
Mixed dyslipidemia	6(5%)	8(1,41%)	14

Table.6 Distribution of dyslipidemia according to age

Parameters	Age			
	<40years	(40-59 years)	>60 years	Total
Hypercholesterolemia	18	200	134	362
Hypertriglyceridemia	2	11	4	17
Low HDL cholesterol	4	14	18	36
High LDL cholesterol	19	161	108	288
Mixed dyslipidemia	1	9	4	14

Women accounted for 77.45% with a sex ratio M / W was 0.28. The average age of patients was 55.83 years with extremes ranging from 4 to 87 years. Patients aged (40-

59) accounted for 55.77% of cases. Patients over 60 accounted for 37.34%. Glycemic equilibrium was not reached in 52.08%. Renal failure is noted in 20 patients (Table 4). The distribution of dyslipidemia as a function of age and sex (Table 5 and 6) shows that subjects aged 40 to 59 and women are more exposed.

The lipid profile is necessary for the detection of dyslipidemia. This study, whose objective was to determine the frequency of lipid balances and the prevalence of dyslipidemia, showed over a period of one year that 684 patients out of the 3503 requests for biochemical assessments received at the biochemistry laboratory, had made the subject of a lipid assessment, i.e. a frequency of 19.52%. A similar study conducted in Cocody by (Tahiou *et al.,* 2010) found a frequency of lipid budgets of 5.7%. This low frequency of prescriptions of the biological balance in general could be explained by the will of the prescribers to minimize the costs of these assessments. According to (Manlan, 2001) the prescription of lipid examinations would be done by specialists in cardiovascular diseases.

In our study 93.12% of the requests included the four parameters and 4.09% demand for cholesterol alone. For (Tahiou *et al.,* 2010) in their study observed that requests for biological tests included on average three biological tests.

The prevalence of dyslipidemia observed in our study is very high (51, 75%), which is like that found in Côte d'Ivoire by (Lokrou *et al.,* 1998) in diabetic subjects (47.4%). These figures are like those found by (Dominique Doupa *et al.,* 2014) in a study in St Louis (63.8%). Our results far exceed those found by Cisse F in Senegal (Fatou Cisse *et al.,* 1937) in Algeria (14.3%) (Yahia-Berrouiguet, 2009) and Mauritania (> 14.8%) (MS / WHO, 2006). Our prevalence is consistent with those observed in the industrialized countries that exceed 30% (Tóth *et al.,* 2012). Dyslipidemia plays a key role in the genesis of cardiovascular diseases and increases mortality morbidity. Screening is important for reducing cardiovascular mortality.

Pure hypercholesterolemia is the most common dyslipidemia observed in our study. For Ndour Mbaye in his study in St Louis (Mbaye *et al.,* 2011) it was a high prevalence of high LDL cholesterol, while that of hypertriglyceridemia is low. It differs in this respect from the study by (Lokrou, 1998), who described 44% hypercholesterolemia and 17% hypertriglyceridemia, as well as the Framingham study (Boland *et al.,* 2000), which showed a predominance of hypertriglyceridemia in the diabetic population. So, the clear majority of our subjects who had hypercholesterolemia also had high LDL cholesterol. The low prevalence of mixed hyperlipidemia and pure hypertriglyceridemia probably results from lipid-lowering therapy given by prescribers. For this purpose, it is necessary for prescribers to complete the clinical indications to allow biologists to interpret the results. About age, our study showed that subjects from 40 to 59 were the most. For Cisse F, the most affected age group is 39 to 59 years old (Fatou Cisse *et al.,* 1937). Women seem to be more exposed to hypercholesterolemia. Indeed, most studies have found a predominance of dyslipidemias and more particularly hypercholesterolemia in women (Dominique Doupa *et al.,* 2014; Scheidt-Nave *et al.,* 2012; Pessinaba *et al.,* 2013). In the National Health Nutrition Study conducted in 2006-2007, the prevalence of dyslipidemias is about 67% in men (Ferrieres *et al.,* 2005).

The determination of the lipid balance is fundamental in diabetics to watch for possible cardiovascular complications. Unfortunately,

this assessment is under-requested by practitioners according to this study, hence the recommendation to systematize it in all diabetic monitoring reports. Our work reports a high prevalence of dyslipidemia in diabetics. However, it requires strengthening prevention strategies through appropriate therapeutic education and optimal balance of diabetes mellitus.

References

Boland B, Chenu P, Descamps O, *et al.*, Dyslipidemia in general medicine: detection, attitude and treatment. Leuven Méd 2000; 119: 79-90.

Dominique Doupa, Abdou Salam Mbengue, Fatou Agne Diallo, Modou Jobe, Arame Ndiaye, Adama Kane, Alassane Diatta, Meissa Toure. Lipid profile frequency and the prevalence of dyslipidemia from biochemical tests at St. Louis University Hospital in Senegal. Pan African Medical Journal. 2014, 17:75

Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert panel on detection, assessment, and treatment of high blood cholesterol in adults (Adult Treatment Panel III). JAMA. 2001; 285 (19): 2486-97.

Fasanmade, OA, Odeniyi IA, Amira CO, *et al.*, Association of body mass index and abdominal adiposity with atherogenic lipid profile in Nigerians with type 2 diabetes and / or hypertension. Niger Med J 2013; 54 (6): 402-7.

Fatou Cisse, Diallo Agne Fatou, Alassane Diatta: Prevalence of dyslipidemias at the biochemistry laboratory of Aristide Dantec University Hospital in Dakar, Senegal, Pan African Medical Journal - ISSN: 1937-8688 (www.panafrican-med-journal.com)

Ferrieres J, Ruidavets JB, Perret B, Dallongeville J, Arveiler D, Bingham A, Amouyel P, Haas B, Ducimetiere P. Prevalence of dyslipidemias in a representative sample of the French population. Heart and Vessel Archives. 2005, 98 (2): 127-32.

International Diabetes Federation. IDF Diabetes Atlas, 8th edn. Brussels, Belgium: International Diabetes Federation, 2017.

Lokrou A. (1998) Hyperlipidemia and diabetes in Côte d'Ivoire: cross-sectional study of 132 cases. Medicine of Black Africa; 45 (10): 555-557

M.-N. Mbaye, K. Niang, A. Sarr, A. Mbaye: Epidemiological Aspects of Diabetes in Senegal: Results of a Survey of Cardiovascular Risk Factors in the City of Saint-Louis. Metabolic Disease Medicine - December 2011 - Vol. 5 - No 6

Manlan K (2001) Activity report of the biochemistry laboratory of the University Hospital of Treichville for 06 months. Thesis Med, n ° 2980.

Mithal, A, Majhi D, Shunmugavelu M, *et al.*, Prevalence of dyslipidemia in adult Indian diabetic patients: A cross sectional study (SOLID). Indian J Endocrinol Metab 2014; 18 (5): 642-7.

MS / WHO. Report of the survey on non-communicable diseases according to the WHO STEP wise approach: study of arterial hypertension, diabetes and other risk factors in Nouakchott Mauritania. 2006. Google Scholar

Pessinaba S, Mbaye A, Yabeta GAD, Harouna H and *et al.*, Prevalence survey of cardiovascular risk factors in general population in Saint-Louis (Senegal). Ann Cardiol Angeiol. 2013; 62 (4): 253-258.

Scheidt-Nave C, Du Y, Knopf H, Schienkiewitz A, Ziese T, Nowossadeck E, Gößwald A, Busch MA. Prevalence

of dyslipidemia among adults in Germany: Results of the German Health Interview and Examination Survey for Adults (DEGS 1). BGG. 2012; 56 (5 6): 325 30.

Tiahou G, Deret K, World A. Agniwo Camara-Cisse M, Djohan Y, Djessou P, SESS D. Frequency of lipid balances and prevalence of dyslipidemias in the biochemistry laboratory of the Cocody chu. J Sci Pharm Biol. 2010; 11 (2): 60-5.

Tóth PP, Potter D, Ming EE. Prevalence of Lipid Abnormalities in the United States: The National Health and Nutrition Examination Survey. J Clin Lipidol. 2012; 6 (4): 325-30.

World Health Organization. The global burden of disease: 2015; Available at: http://www.who.int/healthinfo/global_burden_disease/2015_report_update/en/index.html

Yahia-Berrouiguet A, Benyoucef M, Meguenni K, Faivre B, Brouri M. Survey on the prevalence of risk factors for cardiovascular diseases in Tlemcen (Algeria). Diabetes Metab. 2009; 35 (1): 42-3.

How to cite this article:

Sow Djiby, A. Ndiaye, Insa Diaw Fall, Sokhna Fall AW, Diédhiou Demba, Ndour Michel Assane, Diallo Ibrahima Mané, Sarr Anna, Diop Saïd Norou, Ndour-Mbaye Maimouna and Niama Diop Sall. 2018. Frequency of Lipid Balances and Prevalence of Dyslipidemies in the Biochemistry Laboratory of the Marc Sankale Center of Dakar. *Int.J.Curr.Microbiol.App.Sci.* 7(12): 3276-3282. doi: https://doi.org/10.20546/ijcmas.2018.712.379