

Lipid Profile Pattern amongst Type 2 DM subjects with Erectile Dysfunction in Benin City, Nigeria

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SUMMARY

Objective: Dyslipidaemia in patients with diabetes mellitus leads to atherosclerosis and this contributes to erectile dysfunction (ED). This study set out to characterize the lipid profile pattern in diabetic patients with erectile dysfunction.

Subject and Methods: A prospective, cross sectional study carried out at the diabetes clinic of the University of Benin Teaching Hospital. Forty diabetic subjects with erectile dysfunction and thirty-two diabetic subjects without erectile dysfunction who served as controls were recruited for the study. Data obtained include anthropometric indices and fasting serum lipids. Data was analyzed with SPSS version 10.

Results: The prevalence of dyslipidaemia was 82.5% in the ED subjects and 68.7% in the control group and this difference was not statistically significant. The ED subjects had greater means of age, body mass index and waist hip ratio than the control group but this was not statistically significant.

The mean values of the lipid profile was higher in the ED patients except for the HDL cholesterol level. Elevated total cholesterol was the most common abnormal lipid parameter, while elevated triglyceride was the least common abnormal parameter seen in both groups.

Conclusion: The prevalence of dyslipidaemia in diabetic subjects with erectile dysfunction is high. Efforts must be put in place to treat dyslipidaemia and other cardiovascular risk factors aggressively to prevent or ameliorate this complication.

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INTRODUCTION

Dyslipidaemia is a risk factor for the development of diabetic complications and contributes significantly to the development of macrovascular complications¹. The most common lipid abnormalities in diabetes include raised triglycerides, low high-density lipoprotein, apo B, and small dense low-density lipoprotein particles^{2,3,4}. Hyperlipidaemia is also a risk factor for

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erectile dysfunction by causing atherosclerosis and the changes with atherosclerosis include endothelial injury, cellular migration and smooth muscle proliferation. Studies have reported an association between erectile dysfunction, vascular disease and cardiovascular risk factors of which dyslipidaemia is one^{5,6,7,8}. Lipid patterns have been reported in diabetic patients from various countries.^{9,10,11}. In Nigeria, reports have shown that dyslipidaemia is highly prevalent in diabetic patients^{12,13}. There is however a paucity of studies of the lipid profile pattern in patients with erectile dysfunction.

This study, therefore set out to determine the lipid profile pattern in diabetic subjects with erectile dysfunction in Benin City.

MATERIALS AND METHODS.

This was a cross sectional, descriptive study carried out at the diabetes clinic of the University of Benin Teaching Hospital, Benin City between June to December 2004. Benin City is located in the south-south geo-political zone in the oil rich Niger-Delta region of Nigeria. Ethical approval for this study was obtained from the ethical committee of the University of the Benin Teaching Hospital, Benin city.

Forty diabetic subjects with erectile dysfunction who consented were recruited for the study. Diabetes Mellitus was diagnosed according to the 1999 WHO criteria¹⁴. Erectile dysfunction was diagnosed using the international index of erectile function (IIEF) which is a standardized and objective tool for diagnosing erectile dysfunction¹⁵. Patients who had a score of <25 on the erectile function domain were diagnosed as having erectile dysfunction.

Thirty-two male diabetic subjects who did not have erectile dysfunction were recruited as controls. Information obtained from the study and control subjects included age, height, weight, body mass index and waist circumference.

Weight in kilogrammes and height in metres was obtained from the weighing scale and stadiometer respectively.

The waist circumference was taken as the midpoint between the ribcage and iliac crest, while hip circumference was taken as the maximal circumference around the buttocks posteriorly and pubic symphysis anteriorly¹⁶. The fasting lipid profile was assessed in the subjects as follows – serum total cholesterol and HDL cholesterol was analyzed using cholesterol oxidase method, serum-triglyceride was assessed using glycerol kinase method, and LDL cholesterol was calculated using friedwald formula viz LDL-cholesterol = Total Cholesterol – [Trigl – HDL].

Data analysis was done using SPSS version 10 (2000) comparison of means was done using the student t-test. Comparison of proportion was done using the chi-square test. The level of statistical significance was taken as p<0.05.

RESULTS

The characteristics of the subjects with erectile dysfunction (ED) and those without ED is shown in Table 1. A total of 72 subjects were studied (forty with ED, and thirty two without ED).

The subjects with ED had higher means of age, body mass index and waist hip ratio but these were not significant ($p > 0.05$). The mean duration of illness in the ED subjects was 6.1 ± 1.7 years, but this difference with the control group (4.1 ± 2.0 years) was also not significant ($p > 0.05$). Mean value of lipid profiles were higher in the subjects with ED, except for HDL cholesterol which was lower in the subjects with ED. This lipid profile pattern is shown in Table 2.

Thirty three of the subjects with ED had dyslipidaemia (at least one abnormal lipid profile) while two persons had abnormalities in all the four lipid parameters. In the group without ED, twenty two subjects had dyslipidaemia, while one person had abnormalities in all the four lipid parameters. In the subjects with ED, elevated total cholesterol was the most common abnormality seen in 29 (72.5%) of the subjects, while elevated triglycerides was the least common seen in 8 (20%) of the subjects, in the subjects without ED, elevated total cholesterol was seen in 16 (50%), and was noted to be the most common abnormality. Elevated triglycerides was seen in 4 (12.5%) of the subjects.

Fifty five of all the subjects had dyslipidaemia with 82.5% of the ED subjects and 68.7% of the control subjects having dyslipidaemia respectively and this difference was not significant ($p > 0.05$).

Tables 1: Clinical Characteristics of Study Subjects

DM Subjects with Erectile dysfunction n=40	DM subjects without Erectile dysfunction n=32	p value
Age 52.5 ± 7.1	52.0 ± 6.7	0.46
BMI 29.1 ± 3.7	27.4 ± 3.9	0.07
WC 101.3 ± 12.3	91.2 ± 13.0	<0.05
WHR 0.99 ± 0.09	0.98 ± 0.07	0.45
Duration Of DM (years) 6.1 ± 1.7	4.1 ± 2.0	0.91

BMI = Body Mass Index; DM = Diabetes Mellitus; WC = Waist Circumference; WHR = Waist Hip Ratio

Tables 2: Lipid Profile Pattern in study subjects

	DM Subjects with Erectile dysfunction n=40	DM subjects without Erectile dysfunction n=32	p value
Total cholesterol (mmol/l)	5.4 ± 1.1	5.1 ± 1.5	0.33
Triglyceride (mmol/l)	1.7 ± 0.4	1.34 ± 0.5	0.001
High Density Lipoprotein (mmol/l)	1.39 ± 0.6	1.46 ± 0.45	0.58
Low Density Lipoprotein (mmol/l)	3.36 ± 0.9	2.76 ± 1.3	0.02

DISCUSSION

People with Diabetes mellitus can have many lipid abnormalities including elevated levels of very low density lipoprotein cholesterol, low density lipoprotein cholesterol and triglyceride and low level of high density lipoprotein cholesterol¹⁷. These patients have a preponderance of abnormalities in the composition of low density cholesterol (smaller, denser particles) which increase atherogenicity even if absolute levels of LDL cholesterol is not increased¹⁷. About 20% of patients with Type 2 DM have hypertriglyceridaemia or low HDL cholesterol levels¹⁸. These abnormalities are powerful risk factors for coronary artery disease in these patients. Diabetic patients with dyslipidaemia frequently develop atherosclerosis. Superoxide which is present in diabetic patients with dyslipidaemia is suspected to play an important role in the initiation of this atherosclerosis¹⁹.

The prevalence of dyslipidaemia in this study is 76.3%; and this was higher in the subjects with erectile dysfunction (ED) (82.5%). This is in accordance with other studies that reported a higher prevalence of dyslipidaemia in diabetic subjects^{20,21}. This high prevalence level may be explained by insulin resistance which is induced by diabetes and which causes diabetic dyslipidaemia. Other factors like increasing urbanization which leads to physical inactivity, sedentary lifestyle and changes in dietary pattern and consequently obesity in the population studied are also important. Obesity may have contributed to high prevalence of dyslipidaemia in this study. Obesity causes insulin resistance which can lead to dyslipidaemia in diabetic subjects and subsequently ED. Majority of our subjects were overweight and this may explain the rise in total cholesterol and other abnormalities. Overweight/obesity is evident in our study either using generalized obesity (body mass index) or central obesity (waist circumference). High prevalence of obesity has been associated with dyslipidaemia in other studies^{22,23,24,25}.

Majority of our subjects had combined dyslipidaemia as reported in other studies, however the rather low occurrence of raised triglycerides, is not in keeping with the typical findings of raised triglycerides in diabetic dyslipidaemia²⁶. However other studies in Nigeria and urban African Americans agreed with our findings more studies are needed in this area to define the racial differences in the aetiology of diabetic dyslipidaemia^{21,27}.

Other factors that may contribute to diabetic dyslipidaemia and erectile dysfunction include poor glycaemic control. Diabetes mellitus is an important organic cause of erectile dysfunction with a prevalence rate of 75% after 30 years of duration of the disease, and the incidence of ED is three times higher in diabetes than in non diabetic²⁸.

Hyperglycaemia increases the risk of ED. High glucose levels affect the vasculature and result in the accumulation of advanced glycation end products which promote vascular disease and neuropathy thus contributing to ED²⁹. Penile erections relies on neural stimulation of the penile vasculature endothelium and corpus cavernosum lacunae to trigger lacunae and smooth muscle relaxation and vasodilatation which spurs filling and erection³⁰. Cardiovascular risk factors like hyperlipidaemia cause vascular damage and thus diminish the response at a number of steps thus promoting ED³¹.

Previous reports have shown an association between erectile dysfunction, vascular disease and cardiovascular risk factors of which hyperlipidaemia is one, with erectile dysfunction being reported as both a symptom and marker of vascular disease

progression^{5,6,7,8}.

Erectile dysfunction is a complication of diabetes mellitus that affects the individual negatively with adverse psychosocial consequences. Most subjects with ED have low self esteem and unless specifically asked will not discuss this issue with their doctor. This also affects their spouses and most of them erroneously attribute it to aging since ED increases with age and hence suffer in silence. With discussions of sexuality usually regarded as a taboo in African societies subjects should be educated that ED is a complication of diabetes and is readily treatable.

Lifestyle modification, adequate treatment of cardiovascular risk factors like hypertension, hyperglycaemia and dyslipidaemia is important in patients with diabetes mellitus to prevent erectile dysfunction or retard its progression in patients who have developed the disease.

CONCLUSION

The prevalence of dyslipidaemia in diabetic patients with erectile dysfunction is high and is associated with overweight/obesity. Lifestyle modification and adequate treatment of cardiovascular risk factors like hyperglycaemia, hypertension, dyslipidaemia and obesity in these subjects is necessary to prevent erectile dysfunction or retard its progression.

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