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Comparison of serum lipid profile in type 2 diabetes with and without adequate diabetes control in Sudanese population in north of Sudan

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ABSTRACT

Background: Diabetes mellitus (DM) is a major health problem in Sudan and is a leading cause of morbidity and mortality. Dyslipidemia is a major complication of diabetes and an important risk factor for cardiovascular disease (CVD). The objective of this study was to determine the prevalence of dyslipidemia and its co-relation with the glycemic control in individuals with diabetes in River Nile State, Sudan.

Methods: Individuals with diabetes attended, Naserudin Karamalla Diabetic (NKDM) Centre, in Atbara teaching hospital during study period, who volunteered to participate were included. Only those on treatment for DM for at least one year were included. Venous samples were collected for cholesterol, triglycerides, HDL, LDL, blood glucose and Glycosylated hemoglobin. Participants were interviewed using standardized pretested questionnaire to record medical history and sociodemographic characteristics. Blood pressure, body mass index (BMI) and waist circumference were measured.

Results: A total of 188 individuals were included. The mean age was 49.5 + 13.9 and (128) 68.1% were females. Most patients were having DM for at least 3–5 years 69 (36.7%). Poor diabetes control (HbA1c >7) was recorded in 87.2%, hypercholesterolemia, hypertriglyceridemia and high LDL were identified in 36.6%, 27.7% and 26.6% respectively. In addition, HDL was low in 61.2% of patients.

Conclusion: Low HDL is a prominent feature in two thirds of individuals with diabetes, while high cholesterol and high triglyceride were seen in over one quarter.

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1. Introduction

River Nile state is part of north Sudan that extends from the north of the capital Khartoum till it ends with border with Egypt. Like any other countries in Africa, Sudan has experienced an increase in urbanisation. Therefore, it is not surprising that the burden of non-communicable diseases was found to exceed that of communicable diseases among patients admitted to medical wards at main teaching hospital in north of Sudan [1]. Importantly, the prevalence of diabetes in urban areas of North Sudan was estimated to be around 19% [2]. Ahmed et al have shown in large population study of 7239 individuals, that the prevalence of

obesity was 21.2% [3]. While, the prevalence of obesity among Sudanese individuals with diabetes was estimated to be 24.5% and overweight was 39.9%, and the prevalence was more in women than men and associated with hypertension [4]. Cardiovascular morbidity and mortality are common complications among individuals with diabetes and can be related to dyslipidemia [5]. Therefore, maintaining normal lipid profile is essential in prevention of cardiovascular disease (CVD). Despite publication of several clinical guideline around the world about the importance of lipid lowering medication in diabetes, many studies reported inadequate treatment for hyperlipidemia in type 2 diabetic patients [6].

Non fasting hypertriglyceridemia is a strong predictor of coronary heart disease (CHD) [7] there is an inverse relationship between serum HDL cholesterol level and triglyceride level in diabetic patients [8]. Low serum HDL is by itself a risk for CHD [9]

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Table 1
Socio-demographic characteristics of diabetic patients in RNS, Sudan.

Characteristic	Variable	No.	%
Sex	Male	60	31.9
	Female	128	68.1
Age group	20–30	25	13.3
	31–40	20	10.6
	41–50	63	28.2
	51–60	51	27.1
	61–70	33	17.6
	Above 70	6	3.2
Tribe	Ga'aleen	79	42.0
	Rubatab	22	11.7
	Shaygia	15	8.0
	Danagla	8	4.3
	Halfaween	7	3.7
	Others	57	30.3
Marital status	Married	150	79.8
	Single	25	13.3
	widow	13	6.9
Educational level	Illiterate	80	42.6
	Basic	43	22.9
	Secondary	48	25.5
	College and above	17	9.0
Residence	Atbara	81	43.1
	Ed Damar	35	18.6
	Berber	29	15.4
	Rural areas	43	22.9
Age at onset of DM (years)	Below 15	11	5.9
	16–20	5	2.7
	21–40	75	39.9
	41–60	87	46.3
	Above 60	10	5.3
Duration of DM at the time of study (years)	Less than 3	2	1.1
	3–5	69	36.7
	6–9	38	20.2
	10–15	49	26.1
	16–25	23	12.2
	More than 25	7	3.7
Type of DM	Type 1 (IDDM)	52	27.7
	Type 2 (NIDDM)	136	72.3
Degree of DM control*	Good control	22	11.7
	Poor control	166	88.3
Hypertension	Present	34	18.1
	Not present	154	81.9

Degree of DM control*: as evidenced by high glycosylated hemoglobin level.

Insulin resistance, which is a major component of the metabolic syndrome and in type 2 DM, creates high level of v-LDL which contains high concentrations of triglycerides resulting in high serum triglyceride and low serum HDL [10–13]. In the view of the increase in prevalence of diabetes, diabetes complications and obesity; the aim of this study was to assess the prevalence of dyslipidemia and its co-relation with the glycemic control among diabetic patients in Naserudin Karamalla Diabetic (NKDM) Centre, River Nile State, Sudan.

2. Material and methods

2.1. Study design

This was a descriptive, cross sectional, hospital-based study.

2.2. Study duration

The study was conducted during the period from January through March 2015.

2.3. Setting and population

Individuals with diabetes who attended the (NKDM) Center in Atbara, River Nile State who volunteered to participate were

included. NKDM Center is the main clinic where diabetic patients in RNS receive specialized care. It is a charitable non-governmental center with all services and medications provided for free to patients. Physicians, ophthalmologists, pediatricians, surgeons and dietitians provide the medical care. The annual turnover of patients is around 3000.

2.4. Study population and sample size

All eligible diabetic patients attending (NKDM) Center in Atbara and who consented to participate were included. Inclusion

Table 2
lipid profile and HbA1c level among diabetic patients in RNS, Sudan.

Variable	Normal/abnormal	No.	%
Cholesterol (mg/dl)	< 200	121	64.4
	> 200	67	36.6
Triglycerides (mg/dl)	< 150	136	72.3
	> 150	52	27.7
LDL (mg/dl)	< 150	138	73.4
	> 150	50	26.6
HDL (mg/dl)	> 60	73	38.8
	< 60	115	61.2
Glycosylated haemoglobin	< 7%	24	12.8
	> 7%	164	87.2

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