Research Article

A BRIEF METABOLIC STUDY ON BIOCHEMICAL CHANGES IN BLOOD OF DIABETIC PATIENTS

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ARTICLE INFO	ABSTRACT
	Diabetes mellitus (DM) is a major endocrine health problem which occurs due to disturbances in carbohydrate metabolism and results in increased blood glucose levels (hyperglycemia). Diabetes mellitus is either immune-mediated (Type 1 diabetes), resistance (Type 2). Diabetes has a worldwide prevalance with India being the diabetic capital of the world by the year 2030, followed by China and USA. This study was carried out to evaluate the biochemical parameters in diabetic and non-diabetic patients. The measured biochemical parameters were fasting blood sugar, ALT, AST, ALP, triglyceride and total cholesterol. Our study included 50 diabetic and 20 non-diabetic subjects (controls). In this study mean values of fasting blood sugar was found to be higher and significant for diabetic patients as compared to their non-diabetic counterparts. In our study serum levels of all liver enzymes (ALT, AST, and ALP) were found to be significant in patients as compared to controls. Also our study showed significant increase in levels of total cholesterol in patients as compared to healthy controls. No significant difference in serum levels of triglyceride (TG) was observed in patients as compared to controls. The outcomes of the present study suggest that FBG, liver enzymes (ALT, AST, and ALP), total cholesterol have shown higher activity with DM patients than individuals who do not have DM.

INTRODUCTION

Diabetes mellitus (DM) is an important metabolic disorder of carbohydrate metabolism characterized by high blood glucose levels. Diabetes mellitus occurs either due to the deficiency of insulin, an anabolic hormone that is produced by the beta islet cells of the pancreas or due to inefficiency of cells to respond to insulin that is being produced. Diabetes mellitus can be classified into two major classes: type 1 diabetes (T1DM) and type 2 diabetes (T2DM). According to a study carried out by World Health Organization 1985 (1). The most common form of diabetes is type 2 diabetes mellitus which accounts for 90-95% of all cases while as type 1 diabetes occurs in 5-10 % of all cases (2, 3). Type 1 diabetes mellitus occurs in young individuals and the main etiological agents responsible for this disorder are Genetic predisposition, autoimmunity and viral infection (4). Type 2 diabetes mellitus occurs among all age groups, including individuals over 40 years of age because of drastic changes in behaviour and increased body mass index (5). Diabetes mellitus occurs throughout the world, especially type 2 diabetes has found to be more common in developed countries, with majority of patients aged between 45 and 64 years. It has also been found that the greatest prevalence is expected in Asia and Africa and by the year 2030 majority of diabetic patients will be from India (6). Because of this study that has been reported by wild *et al*, India is often called as the Diabetic capital of the world. According to study reported by International Diabetes Federation, it has been estimated that 366 million people had DM by the year 2011 and by 2030 this number is estimated to almost around 552 million with highest number of cases being found in India. Furthermore, as diabetes mellitus is associated with hyperglycemia which often occurs due to defective insulin secretion, resistance to insulin action, or a combination of both. An important manifestation of these defects in insulin secretion or action are the alterations that occur in lipid and protein metabolic pathways.

MATERIAL AND METHOD

Sample Collection: The blood samples of diabetic patients were collected in EDTA and plane clot activator vials. Serum was separated from clot activator vials by centrifugation and stored in eppendorf tubes for biochemical analysis. The information regarding gender, age and residence were collected from the record file of patients present in the record section of Santosh hospital, Ghaziabad, UP, India.

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RESULTS

Biochemical analysis from serum samples was performed with the commercially available kits of acurax while rest volume of the sample were stored at -20^0C. Biochemical parameters like Glucose, AST, ALT, ALP, TC, TG were estimated by semi automated analyzer (Photometer V5+, Berlin) The samples were allowed to thaw properly prior to assay, mixed thoroughly. Hemolysed and lipemic samples were rejected. Results obtained were analysed with the help of SPSS soft were setting of significant level at $p \leq 0.05$.

Table IV Showing biochemical parameters among diabetic patients and controls

Parameter	Diabetic patients (50)	Controls (20)	P. Value
Glucose	150.48±1.81	89.30±1.69	0.000
AST	38.92±1.05	20.60±0.89	0.000
ALT	39.56±0.61	23.80 ±2.43	0.000
ALP	93.88±1.96	79.50±1.47	0.002
Ttriglyceride	158.82±1.63	151.40±2.88	0.061
Total Ccholesterol	179.62±2.86	157.70±2.97	0.001

As shown in above table there was significant increase in levels of fasting blood glucose (150.48±1.81 vs 89.30±1.69 p<0.000) and cholesterol(179.62±2.86 vs 157.70±2.97 p<0.001) in diabetic patients compared to healthy controls. There was no significant difference in serum TG of patients and controls (158.82±1.63 vs 151.40±2.88 p>0.05) respectively. Further significant increase in levels of liver enzymes ALT, AST, ALP was observed in serum of diabetic patients as compared to healthy controls (39.56±0.61vs 23.80 ±2.43 p<0.000), (38.92±1.05 vs 20.60±0.89 p<0.000) and79.50±1.47 p<0.002) respectively.

DISCUSSION AND CONCLUSION

In the present study it has been found out that there was significant rise in fasting blood glucose, total cholesterol and liver enzymes (AST, ALT, ALP) levelsexcept triglycerides which also increased but it was not statistically significant (p>0.05). Significant rise in total cholesterol levels have been reported by Belay Z *et al* in type II diabetes mellitus patients as compared to control group (7). The current study is also in accordance with previous studies as reported by Belay Z *et al* (7). According to the studies carried out by Philip R *et al* ,significant increase in levels of AST, ALT between diabetic patients compared to healthy controls have been reported which in turn further support our studies (8). Another study that was carried out in north India by Agarawal *et al* have reported serum levels of AST, ALT, ALP and were significantly elevated in type II diabetes mellitus patients as compared to controls(p<0.05) (9).Our study showed there was no significant difference in serum triglyceride((TG) levels of patients and controls (158.82±1.63 vs 151.40±2.88 p>0.05) respectively, so our study supports the findings of Parial *et al.,*2014 (10).

The limitation of the present study was a small sample size. Further large sample size studies are required to further support our results.

The outcomes of the present study showed higher activity of all liver enzymes (ALT, AST, and ALP) in diabetic patients as compared to healthy controls. The significant increase in elevation of all these liver enzyme which could be due to direct hepatotoxic effect of fatty acid on the liver when it is produced in excess. The deficiency of insulin lowers the activity of the enzyme lipoprotein lipase and thereby increases the level of triglycerides. As prevention is better than cure all persons with DM should follow a healthy lifestyle, diet, exercise regularly, avoid sedentary lifestyle and get regular check-ups of FBS and lipid profile to reduce the risk of coronary artery disease.

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