A STUDY TO ASSESS THE BIOCHEMICAL PROFILE IN HEALTHY YOUNG MEDICAL PROFESSIONALS IN INDIA

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Abstract

Introduction: Cardiovascular diseases are the most prevalent cause of mortality and morbidity in both developed as well as developing countries. Coronary artery disease (CAD) is usually due to atherosclerosis of large and medium sized arteries. Dyslipidemia and hyperglycemia have been found to be the important contributing factors.

Aims and objectives: Present study is done to know the pattern of dyslipidemia and blood glucose status as per National Cholesterol Education Program – Adult treatment panel III (NCEP-ATP III) guidelines and American Diabetes Association (ADA) criteria respectively in young doctors and to sensitize the importance of its implication and to take timely preventive measures.

Material and methods: This is a retrospective observational study conducted in a tertiary care hospital. The study group comprised of 173 young doctors from all over India, between age 25 to 29 years who reported to lab for routine medical investigations. The study group included 118 males and 55 females. Serum lipid profile and plasma glucose for 173 subjects were analyzed.

Results: In our study 71.7% of total study group had impaired range of plasma glucose values and 10.4% had diabetic range plasma glucose. 5.78% of total subjects had Triglyceride (TG) level more than 200 mg/dL. 45.66% of total subjects had Low density lipoprotein cholesterol (LDLc) more than 130 mg/dL. 11.56% had total cholesterol (TC) level >240 mg/dL. Thereby implying that even apparently healthy young medical professionals are at increased risk of metabolic disorders like diabetes and dyslipidemia.

Conclusion: This study revealed higher prevalence of hyperglycemia and dyslipidemia in apparently healthy medical professionals suggesting higher risk for metabolic disorders like coronary artery disease and diabetes mellitus. The study indicates the need for physical exercise, change in dietary pattern and regular monitoring of biochemical indicators of metabolic diseases.

Keywords: Dyslipidemia, Impaired fasting glucose, young, doctors, diabetes

Introduction:

Cardiovascular diseases are the most prevalent cause of death and disability in both developed as well as developing countries [1]. Non communicable diseases like type 2 diabetes mellitus (type 2 DM) and CAD has become commoner than communicable diseases in terms of morbidity and mortality in India [2]. CAD is usually due to atherosclerosis of large and medium sized arteries and dyslipidemia has been found to be one of the most important contributing factors [3]. Present study is done to know the pattern of dyslipidemia and blood glucose status as per NCEP – ATP III guidelines and ADA criteria in young doctors and to sensitize the population about the importance of its implication and to take preventive measures.

Material and Methods

A retrospective observational study conducted in a tertiary care hospital after necessary approval from institutional ethical committee. The study group comprises of young doctors between age group of 25 to 29 years who reported to the lab for routine
medical investigations during January 2019 to June 2019. A total of 173 doctors reported to the lab which included 118 males and 55 females. The sample collection was carried out after 12 hours of fasting. Blood was collected in gray top and red top plain vacuum evacuated tubes for analysis of plasma glucose and serum lipid profile respectively. Analysis was performed on Siemens fully automated biochemistry analyzer using IFCC approved methods for plasma glucose, TC, TG and HDLc. LDLc was calculated by Friedewald’s formula. NCEP-ATP III guidelines [4,5] were used for assessment of lipid profile. ADA Criteria [6] was followed for assessment of glycemic status. Mean and standard deviation for all the analytes was calculated.

**Statistical analysis:**

Data was entered, compiled and analyzed using Microsoft Excel. Lipid profile and glucose levels were expressed as the mean ± SD. Prevalence of dyslipidemia, impaired fasting glucose (IFG) and diabetes was calculated by using the prevalence rate formula (number of individuals per total number of all subjects at the time of study multiplied by 100). Results were expressed as percentage.

**Result**

Total of 173 young doctors were included in the study. Biochemical parameters assessed (Glucose, TG, TC, LDLc & HDLc) along with their mean ± SD is as per table 1. A total of 31(18%) individuals had normal range fasting glucose and 142(82%) had deranged values (details in table 2). 107 (62%) individuals had normal range TC and 66(38%) had deranged values (detail in table 3). 147(85%) individuals had normal range TG and 26(15%) had deranged values (details in table 4). 38 (22%) individuals had normal range LDLc and 135(78%) had deranged values (detail in table 5). 74(63%) males had normal range TG value and 22(40%) had deranged values (detail in table 6).

**Table 1: Biochemical parameters in study population**

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>173</td>
<td>110.24</td>
<td>12.13</td>
<td>80</td>
<td>169</td>
</tr>
<tr>
<td>TG</td>
<td>173</td>
<td>99.73</td>
<td>56.79</td>
<td>22.41</td>
<td>350.18</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>173</td>
<td>193.26</td>
<td>36.59</td>
<td>100.4</td>
<td>268.27</td>
</tr>
<tr>
<td>LDLc</td>
<td>173</td>
<td>126.5</td>
<td>33.1</td>
<td>39</td>
<td>211.12</td>
</tr>
<tr>
<td>HDLc in males</td>
<td>118</td>
<td>44.78</td>
<td>11.38</td>
<td>21.47</td>
<td>70.28</td>
</tr>
<tr>
<td>HDLc in females</td>
<td>55</td>
<td>50.95</td>
<td>9.76</td>
<td>28.83</td>
<td>71.93</td>
</tr>
</tbody>
</table>

**Discussion**

According to Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study where data from 15 states were studied, the overall prevalence of prediabetes and diabetes in India was 7.3% and 24.7% respectively [7]. In our study 71.7% of medical professionals were found in prediabetic range which is very high compared to general population and 10.4% in diabetic range which is close to that of general population. The ICMR-INDIAB study brought out that the factors responsible for higher prevalence of both prediabetes and diabetes may be physical...
inactivity, dietary patterns, obesity prevalence and possibly genetic variation. Gupta A et al [8] in their study in an urban Indian population found the overall prevalence of diabetes and impaired fasting glucose to be 8.6% and 5.3% respectively. The values of IFG in their study were lower compared to our study. Study done by Clara K Chow et al [9] on rural India population reported the prevalence of IFG as 15.5% which is lower as compared to our study. Haffner SM et al. [10] reported higher prevalence of DM in higher social class due to increased prevalence of obesity. Study in USA [11] found that the prevalence of DM in an adult population was 26%. In our study higher percentage of IFG may be explained by the factors of decreased physical activity, sedentary lifestyle and uncontrolled eating habits. Study done by Ramachandra A et al [12] found 13.3% of doctors in their study groups to have diabetic range plasma glucose. They also carried out lipid profile in their study with values of TG, TC, LDLc and HDLc lower compared to our study. Sahai S et al. assessed [13] 100 subjects, with age group between of 16 to 65 years for the prevalence of impaired fasting glucose in population reporting to tertiary care centre which was found to be 18%. Percentage of prediabetes in age group of 26 to 35 years was 14.28% in males and 13.33% in females. Study carried out by Basu S et al [14] showed mean value of fasting plasma glucose as 113±49.8 mg/dL, TC was 193±50 mg/dL, TG level was 146±80 mg/dL and 21.4% of the population had DM, 39.72% had high cholesterol compared to 38% in our study, 36.72% had high triglycerides compared to 15% in our study which is lower than the above mentioned study. Study done by Skar M [15] in urban south Indian population depicts a higher risk of DM in ascending social class which was explained by obesity. High social class assures better living conditions and in turn leads to obesity which is an independent risk factor for development of DM. Higher prevalence of DM, hypercholesterolemia, hypertriglyceridemia, higher LDLc and low HDLc in our study is in accordance to study done by Sawant et al [16] in which 7% of study population had DM and 40.9% had hypercholesterolemia, 8.2% of males had low HDLc and 10.7% of females had low HDLc levels. Explanation given in the above study is that diet with high fat and calorie intake and lack of physical activity would be the major culprit of dyslipidemia in above study. Low HDLc levels are stronger predictor of occurrence and reoccurrence of myocardial infarction (MI) and stroke and also associated with premature and severe CAD [17]. Oxidative modification of LDLc is a key process of atherosclerosis and elevated LDLc has been recognized as primary risk factor for CAD by NCEP-ATP III [18]. In another study conducted in Chennai India [19], it was reported that around 75% of patients with myocardial infarction had Total Cholesterol levels < 299 mg/dL indicating that the threshold for occurring MI in Indians is low and if we compare the value of TC in our study, the mean value is 193.26±36.59 mg/dL. Misra A et al [20] reported that the body composition of South Asians are such that they have high percent of body fat, abdominal obesity, insulin resistance, hyperinsulinemia and low muscle mass which predisposes them towards metabolic syndrome. Begum et al.[21] conducted a study on young medical students and found that the values of TC, TG, LDLc and HDLc were lower compared to our study with no correlation between any of the lipid profile values with body mass index. Bhowmik et al.[22] reported lower mean value of HDLc and higher mean value of TG in their study with strong association with prediabetes and diabetes mellitus. Among the parameters assessed (plasma glucose, TC, TG, LDLc, HDLc) in young doctors in our study, higher prevalence (71.7%) of IFG, compared to other studies is a significant finding.

Conclusion

This study revealed higher prevalence of impaired fasting glucose, diabetes mellitus and also dyslipidemia in apparently healthy medical professionals suggesting higher risk for metabolic disorders like coronary artery disease and diabetes mellitus. It could be due to extremely hectic schedule leading to lack of physical inactivity and stressful lifestyle in young doctors. The study indicates the need for physical exercise, change in dietary pattern and regular monitoring of biochemical indicators of metabolic diseases.

References

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