Abstract

Objective: To study the clinical and biochemical profile of newly diagnosed type 2 diabetes mellitus patients who belong to rural areas.

Methodology: The study was conducted on 105 newly diagnosed type 2 diabetes mellitus patients. A detailed history and thorough clinical examination was done. Anthropometric measurements were recorded. Investigations were done to assess micro vascular, macro vascular complications and lipid profile.

Results: There were 54 males and 51 females. The mean age of patients was 49 years. The mean BMI of males was 23.3 kg/m² while that of females was 25.9 kg/m². Waist Hip ratio was 0.97 in males and 0.92 in females. 30% patients had hypertension. 30% patients had a serum triglyceride level more than 150 mg%, 20% patients had total serum cholesterol more than 200 mg%, 10% patients had LDL cholesterol more than 130 mg%. The prevalence of neuropathy, retinopathy and nephropathy was 23%, 15% and 19% respectively.

Conclusion: The present study shows that newly diagnosed type 2 diabetic rural males have a near normal BMI even by the Indian criteria. The waist circumference of males was also within normal limits for Indians. Prevalence of metabolic syndrome was also very low in newly diagnosed male patients.

Introduction

Diabetes Mellitus is a major public health problem in India. The prevalence of T2DM is 11% in urban areas while it is 3-9% in rural areas.¹ There are studies which have found a prevalence as high as 13.2% in rural areas.² The prevalence of Type 2 Diabetes Mellitus is increasing worldwide. The increase is present both in urban and rural areas. Most of the studies on diabetes done in India are on urban patients. We therefore decided to conduct this study to profile the newly diagnosed T2DM patients who came from rural areas.

Material and Methods

The study was conducted in the Department of Medicine Era’s Lucknow Medical College and Hospital Lucknow. Since our medical college is situated on the outskirts of Lucknow we get a lot of patients from the rural areas of Lucknow and adjoining districts.

105 newly diagnosed patients coming from rural areas were included in the study. They had a diagnosis of T2DM within 3 months of presentation. After a written informed consent, all patients were subjected to detailed history and thorough clinical examination. They were also subjected to routine investigations and investigations for evaluation of complications. 24 hour albumin estimation was done for assessment of nephropathy. The evaluation of neuropathy was done on the basis of symptoms and other modalities including assessment of ankle reflexes, vibration perception using 128Hz tuning fork and the use of 10 g mono filament Fundus examination was done.
for retinopathy. ECG was recorded in all patients and coronary artery disease was diagnosed on the basis of clinical features and ECG changes.

Anthropometric measurements were taken. Weight was recorded to the nearest kg. Height was measured in cms. BMI was calculated by the formula wt in kg/ (ht in m)^2.

Waist circumference was measured at the midpoint between lower border of rib cage and highest point of iliac crest. Hip circumference was taken as the largest diameter around buttocks.

Observations

Out of 105 patients 54 were males and 51 were females. The mean age of patients was 49 years. Majority of patients were in the age range of 45-49 years. The mean BMI of male patients was 23.3 kg/m² while that of female patients was 25.9 kg/m². The mean waist circumference for males was 86.4 cm while that of females was 83.2 cm.

Family history of diabetes was found in only 4 patients.

Discussion

We are a suburban medical college with a catchment area of villages situated nearby. We therefore get to see a lot of rural diabetic patients.

The anthropometric measurements of our patients in the present study reveal that the male patients had a BMI which was well within the normal range. Although it is known that Indians are prone to developing diabetes at a lower BMI in comparison to the Western population, the BMI of rural males was nearly normal even by the Indian criteria. The abdominal circumference was also within accepted values for Asians. In contrast the female patients had a

Table 1 : Age and anthropometric characteristics of the study population

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>49.06±10.16</td>
<td>47.8±7.7</td>
<td>48.4±9.07</td>
</tr>
<tr>
<td>Weight in kg</td>
<td>63±12.5</td>
<td>58.4±9.2</td>
<td>60.7±11.2</td>
</tr>
<tr>
<td>Height in cm</td>
<td>163.8±5.06</td>
<td>149.8±7.08</td>
<td>156.8±9.2</td>
</tr>
<tr>
<td>BMI in kg/m²</td>
<td>23.35±3.7</td>
<td>25.9±4.6</td>
<td>24.67±4.41</td>
</tr>
<tr>
<td>Waist circumference in cm</td>
<td>86.4±11.9</td>
<td>83.2±8.1</td>
<td>84.8±17.7</td>
</tr>
<tr>
<td>Hip circumference in cm</td>
<td>88.7±12.2</td>
<td>90±8.6</td>
<td>89.4±10.59</td>
</tr>
<tr>
<td>W: H ratio</td>
<td>0.97±0.05</td>
<td>0.92±0.05</td>
<td>0.94±0.05</td>
</tr>
</tbody>
</table>

Table 2 : Lipid profile and blood sugar of patients in study population

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol</td>
<td>153±49.1</td>
<td>183±32.5</td>
<td>166±44.5</td>
</tr>
<tr>
<td>LDL Cholesterol</td>
<td>90±32.7</td>
<td>99±26</td>
<td>95±23.6</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>37±7.8</td>
<td>40.2±4.1</td>
<td>38±6.3</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>133±45.3</td>
<td>153±54.9</td>
<td>143±50.9</td>
</tr>
<tr>
<td>FBS</td>
<td>185±47</td>
<td>183±33.7</td>
<td>184±40.9</td>
</tr>
<tr>
<td>PPBS</td>
<td>309±96</td>
<td>309±58</td>
<td>309±79.8</td>
</tr>
</tbody>
</table>

All values in mean ± SD and in mg/dl

Fig. 1 : Prevalence of various complications and co morbid conditions in study population

Fig. 2 : Distribution of waist circumference in cms in the study population
higher BMI and abdominal circumference. Most of the female patients were housewives and led a sedentary lifestyle. In contrast, one fourth of male patients were farmers and led an active lifestyle. Shekhar et al.\(^5\) in their study in Mysore on urban patients found the BMI to be 23.9 in males and 25.3 in females.

Family history of diabetes was not present in most of our patients. One reason for this could be lack of knowledge about the disease. A study by Fatima et al.\(^4\) done at our centre in 2011 revealed a significant ignorance about the disease.

30% of our patients were found to be Hypertensive using the criteria of ≥ 140/90 mm of Hg. 39% of female patients were found to be Hypertensive while 22% males had hypertension. 30% of female patients had Triglyceride level of more than 150 mg% while 20% males had TG level > 150 mg%. 26% females had a cholesterol level of > 200 mg% while only 6% of males had a cholesterol level > 200 mg%. 13 mg% of females had HDL cholesterol > 150 mg% while only 6% of males had LDL cholesterol > 130 mg%. 30% males had HDL > 40 mg% while none of the female patients had HDL cholesterol level of more than 50 mg%. So most of our male patients did not have major lipid abnormalities.

The most common micro vascular complication was neuropathy. It was present in 23% patients. Most of the patients presented with pain in lower limbs accompanied by tingling. Dutta et al.\(^5\) in their study found peripheral neuropathy in 29% patients. Unadike et al.\(^6\) found neuropathy in 38.8% of patients.

16% of our patients had retinopathy as evidenced by fundoscopy. Majority of these patients had grade 1 or 2 retinopathy. UKPD\(^5\) had found 35% retinopathy in their patients. Ismat Ereifej\(^8\) found retinopathy in 22.6% patients.

16% of our patients had nephropathy. Of these 81% patients had micro albuminuria while 19% patients had overt nephropathy. Other studies on newly diagnosed patients have found a higher percentage (25-30%) of nephropathy. Weerasuriya\(^9\) in his study found nephropathy in 29% patients.

16% of our patients had pulmonary tuberculosis. Some of these patients had come for symptoms of tuberculosis and T2DM was diagnosed after their TB was established. It is known that patients with diabetes have a higher incidence of tuberculosis. According to WHO\(^10\) individuals with diabetes have 2-3 times the risk of developing tuberculosis than non-diabetics. According to a study by Catherine et al.\(^11\) diabetes accounted for 14.8% cases of tuberculosis in India. This study also concluded that prevalence of tuberculosis in diabetes had a higher prevalence in urban areas when compared to rural areas. In a study done in Imphal, screening of diabetic patients revealed a pulmonary tuberculosis prevalence of 27%.\(^12\)

**Conclusion**

The present study on newly diagnosed rural diabetics shows that males at the time of diagnosis are not obese even by the Indian criteria. In fact they had a BMI slightly above the normal values. The waist circumference was also normal by Indian standards. Majority of male patients did not fit into the criteria of metabolic syndrome. Hypertension was the commonest co morbidity seen. The prevalence of complications is not high at the time of diagnosis. Neuropathy was the commonest complication. Pulmonary tuberculosis is fairly common in rural diabetics.

**References**