



## A CLINICAL STUDY OF MICROVASCULAR COMPLICATIONS IN A NEWLY DIAGNOSED DIABETES MELLITUS.

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**KEYWORDS :** Diabetic mellitus, Proteinuria, Retinopathy, Neuropathy, Nephropathy

### AIM OF THE STUDY:

To study the presence of various microvascular complications in patients with newly detected Diabetes Mellitus.

### MATERIALS AND METHODS:

Patients with newly diagnosed Diabetes Mellitus presenting to department of Medicine, New Government General Hospital, attached to Siddhartha Medical College, Vijayawada from May 2016 to May 2017. They presented to physician either for routine checkup or have been admitted for some other illness and diabetes was detected by chance for first time. Known cases of diabetes mellitus under treatment were excluded from study.

**Sample Size:** 100 cases

**Sample procedure:** Cross-sectional study

**Study Duration:** May 2011 to August 2012

**Inclusion criteria:** Patients with newly diagnosed Diabetes Mellitus presenting to MGM Hospital.

Criteria for establishing Diabetes Mellitus:

1. Fasting plasma glucose  $\geq 126$ mg/dl (7.0mmol/dl). (Fasting is defined as no calorie intake for at least 8 hours)
2. Postprandial plasma glucose  $\geq 200$ mg/dl (2 hours after 75gm of oral glucose)

**Exclusion criteria:** Congestive cardiac failure, Urinary tract infection, Known hypertensives, Fever, Renal diseases, Other diseases causing peripheral neuropathy.

**Method of collection of data:** Clinical history, Clinical examination, Direct ophthalmic examination of fundus, routine investigations like Fasting plasma glucose, Post prandial plasma glucose, Urine for proteinuria, Blood urea & serum creatinine, Urine culture, ESR, Hb A1C, Serum electrolytes, Albumin Creatinine ratio, ECG, Chest X-ray, Enthesiometry and Nerve Conduction Studies.

**DISCUSSION:** The public health importance of diabetes is because of the complications associated with it. According to the International Diabetes Federation (IDF), India is going to have close to 70 million individuals with diabetes by the year 2025<sup>1,2</sup>. Diabetes along with other chronic noncommunicable diseases has emerged as a leading cause of mortality in Indians. Diabetes mellitus is characterized by asymptomatic phase between actual onset of hyperglycemia and clinical diagnosis which has been estimated to last at least 4-7 years<sup>3</sup>.

Although various microvascular complications do not occur at onset of disease due to delay in diagnosis they are commonly present at the time of diagnosis. Various micro vascular complications in diabetes mellitus includes

Diabetic Retinopathy  
Diabetic Nephropathy  
Diabetic Neuropathy

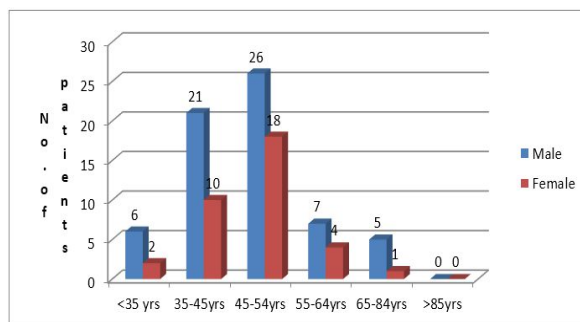
Some studies have shown diabetic retinopathy is common in patients

with newly diagnosed diabetes mellitus<sup>4</sup>. It is seen in 39% of men and 35% of women, with marked retinopathy present in 8% men and 4% women at the time of diagnosis of diabetes mellitus in UKPDS<sup>5</sup>. It remains the leading cause of blindness in working aged Americans. With appropriate medical and ophthalmologic care, more than 90% visual loss can be prevented. The rate of development and progression of retinopathy were significantly reduced after intensive Insulin therapy. 20% of patients have retinopathy at the time of diagnosis of diabetes<sup>6</sup>. We studied newly diagnosed diabetic patients presented to department of medicine to New Government General Hospital, Vijayawada over a period of 12 months.

### AGE & SEX:

In present study 100 newly diagnosed diabetic patients were studied to determine prevalence of diabetic complications (65 males and 35 females) with mean age  $\pm$  2SD = 48.55  $\pm$  10.35.

**Fig.1: Distribution of cases according to Age and Sex:**



Out of 100 patients with newly diagnosed diabetes, 65% were males (65 males) and 35% were females (35). 44% of the patients were within age of 45-54yrs, 31% of them were within 35-44yrs. So maximum numbers of patients were clustered between 35-54yrs of age (44% +31%=75%). Mean age was found to be 48.55 $\pm$ 10.35. None of the patients were above 85 years. The mean age in our study is closely related to the study by Manish Sirshat et al<sup>8</sup> and was slightly higher than study done by Nambuya AP et al<sup>7</sup> and Weersuriya et al<sup>9</sup>.

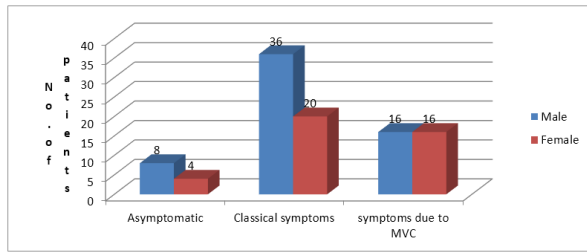
### SYMPTOMS:

In present study 56% of patients presented with classical symptoms of Diabetes Mellitus and 36% with weight loss. In a study conducted by V.Sekhar et al, classical symptoms were 21% and weight loss was 47%. The data are varying probably because there were small number of cases in present study.

**Table.1: showing number of patients asymptomatic, with classical symptoms of diabetes and who had Microvascular complications (MVC):**

|   | Male | Female | Total   |
|---|------|--------|---------|
| Asymptomatic                                | 8    | 4      | 12(12%) |
| Classical symptoms                          | 36   | 20     | 56(56%) |
| Symptoms due to microvascular complications | 16   | 16     | 32(32%) |

**Fig.2: Distribution of cases according to symptoms of Diabetes and MVC:**

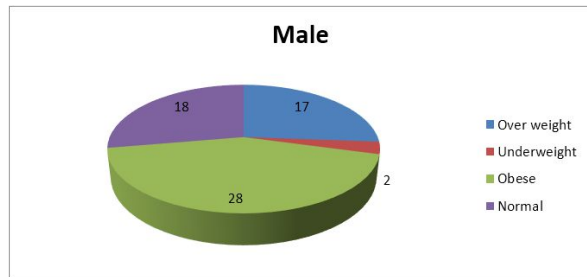


About 32% of patients presented with symptoms due to microvascular complications out of which 16% were males and 16% were females and 12% of the are asymptomatic and accidentally detected as Diabetes.

**BMI:**

BMI was available in 100 patients study of which 30% were overweight, out of which 12% were males and 18% females. None of the females were underweight but 2% males were underweight. 10% of the patients were obese out of which 4% were males and 6% were females. So 68.57% of female patients were having increased BMI (17.14% obese and 51.42% overweight).

**Fig.3: Distribution of cases according to BMI:**



**WAIST HIP RATIO:**

Waist hip ratio was available for all patients, 24.6% males and 68.5% females had central obesity. Overall 40% of patients had central obesity at the time of diagnosis of Diabetes Mellitus. Mean Waist Hip ratio was found to be 0.97+/-0.08.

**Table.2: showing number of patients who were having central obesity and their percentage according to Waist Hip ratio:**

|                 | Male (N=65) | Female (N=35) | Total   |
|-----------------|-------------|---------------|---------|
| Central obesity | 30(46.1%)   | 27(77.1%)     | 57(57%) |

**INFECTIONS:**

In our study 10% of patients had pneumonia, 6% had fungal infections, 2% had cellulitis, 2% had gluteal abscess, 4% had tubercular pleural effusion. It probably indicates that Indians with Diabetes were prone for infections and tuberculosis was little high in Indian study including present when compared to Nambuya A P et al study.

**Table.3: Showing number of patients who were presented with various infections:**

| Infections            | Male | Female | Total |
|-----------------------|------|--------|-------|
| Foot ulcers           | 6    | 2      | 8     |
| Cellulitis            | 1    | 1      | 2     |
| Fungal infections     | 4    | 2      | 6     |
| Respiratory system    |      |        |       |
| Tuberculosis          | 1    | 1      | 2     |
| Pneumonia             | 6    | 4      | 10    |
| Pleural effusion      | 3    | 1      | 4     |
| Urogenital infections | -    | -      | -     |
| Others                |      |        |       |
| Gluteal abscess       | 1    | 1      | 2     |
| Amoebic liver abscess | -    | -      | -     |

**MICROVASCULAR COMPLICATIONS:**

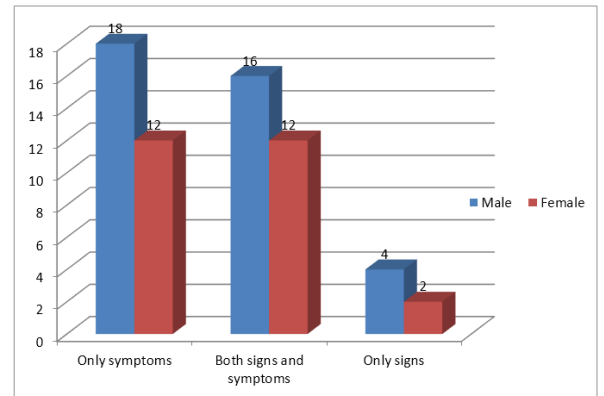
**NEUROPATHY:** Symptomatic peripheral neuropathy are more common than asymptomatic.36% of the patients presented with

peripheral neuropathy at the time of diagnosis of Diabetes.30% of the patients (18% males and 12% females) were presented with only symptoms of peripheral neuropathy, 6% of them were presented with only signs of peripheral neuropathy, 24% of them(14% males and 10% females) were having both signs and symptoms.

**Table.4: Showing total number of patients with peripheral neuropathy based on signs and symptoms:**

| Peripheral Neuropathy   | Male | Female | total |
|-------------------------|------|--------|-------|
| Only symptoms           | 18   | 12     | 30    |
| Both signs and symptoms | 16   | 12     | 28    |
| Only signs              | 4    | 2      | 6     |

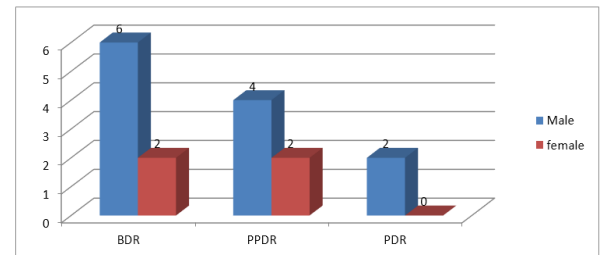
**Fig.4: Distribution of cases with Neuropathy:**



**RETINOPATHY:**

Borderline retinopathy (BDR) is more common than Proliferative retinopathy (PDR) at the time of diagnosis. Totally 16%(12% males and 4% females) of the patients had retinopathy at the diagnosis. 4% of the patients had maculopathy at the time of diagnosis. None of the patients presented with loss of vision at the time of diagnosis. In our study the percentage of patients who presented with retinopathy was nearly equal to Thompson T J et al<sup>10</sup> and Wang Y et al<sup>11</sup>.

**Fig.5: Distribution of cases with Retinopathy:**



**NEPHROPATHY:** in our study 20% of the patients presented with incipient nephropathy at the time of diagnosis. 5% of the patients had macroalbuminuria. 25% of the patients presented with diabetic nephropathy at the time of diagnosis of Diabetes Mellitus. Significant number of patients were presented with incipient nephropathy(20%).

**Table.5: Showing number of patients with Diabetic nephropathy in patients with newly diagnosed Diabetes Mellitus:**

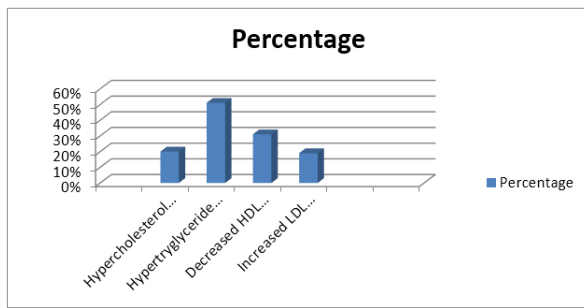
| Proteinuria      | Male | Female | Total |
|------------------|------|--------|-------|
| Microalbuminuria | 8    | 12     | 20    |
| Macroalbuminuria | 2    | 3      | 5     |

**BLOOD SUGAR LEVELS:**

Mean Fasting blood sugar (FBS) and Post prandial Blood sugar (PPBS) levels were low in our study than other studies done by S S Murthy and Cathelineau G et al.

**LIPID PROFILE:**

Hyperlipidemia under high risk category was almost equal in both males and females. Total cholesterol, HDL and LDL cholesterol levels were higher in males than females under borderline risk. 22% of the patients had hyperlipidemia.

**Fig.6: Percentage of patients with various lipid levels:****CONCLUSION:**

- 52 out of 100 newly diagnosed Diabetes Mellitus were presented with microvascular complications.
- More than 50% of the patients had microvascular complications at the time of diagnosis of Diabetes Mellitus.
- Neuropathy was found to be the commonest microvascular complication followed by Diabetic nephropathy and Diabetic retinopathy.
- Commonest type of neuropathy was bilateral symmetrical sensorimotor type.

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