A study of the prevalence of metabolic syndrome in newly detected Diabetes Mellitus Type 2

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INTRODUCTION

The metabolic condition (MS) is depicted as lots of anomalies including stomach rotundity, insulin restriction, hypertension, hyperglycaemia, extended greasy oils, and reduced high-thickness lipoprotein cholesterol (HDL-C) (Grundy, 1998). The measure of individuals with the metabolic condition likewise separates by sex, race, and character. Most patients with diabetes have a metabolic condition with studied ordinariness of 69.9 per cent for Whites, 64.8 per cent for Blacks, and 62.4 per cent for Mexican Americans. Type 2 diabetes mellitus (T2DM) is a significant danger factor for coronary course illness (CAD) and stroke. In any event, 65 per cent of individuals with T2DM die of some coronary illness and stroke (Thompson, 1999).

Patients with T2DM have an expanded commonness of lipid anomalies, which add to higher paces of CAD. High fatty oil and low HDL cholesterol levels were altogether identified with all coronary illness occasions and to coronary mortality in patients with T2DM (Lehto et al., 1997). Moreover, the commonness of CAD in diabetes patients expands fundamentally with the option of MS parts (Alexander et al., 2003). As indicated by Third National Health and Nutrition Examination Survey (NANES...
III) information, individuals who didn’t have MS, had the most reduced danger for cardiovascular illness (CVD) occasions, those with MS had a middle degree of danger, and those with diabetes had most elevated danger (Park et al., 2003).

Considering information from the National Health and Nutrition Examination Survey (NHANES) III, the age-balanced commonness of the metabolic issue in the United States is 34% for men and 35% for ladies. In France, a 30-64-year-old companion shows a <10% perservasiveness for each sexual orientation, albeit 17.5% are influenced in the 60-64 year age. Increments in midriff periphery prevail in ladies though fasting fatty substances >150 mg/dL and hypertension are more probable in men (Fauci et al., 2008). The term diabetes mellitus depicts a metabolic issue of different aetiology portrayed by unending hyperglycaemia with aggravations of sugar, fat and protein handling coming to fruition because of imperfections in insulin spread, insulin development, or both (World Health Organization, 1999).

The predominance of diabetes has expanded significantly over the most recent thirty years. A metabolic disorder is a solid danger factor for the occurrence of diabetes. Way of life mediations that help diminish body weight and pharmacologic intercessions that address insulin obstruction and additionally postprandial glycaemia may help forestall diabetes. Serious cardiovascular danger factor the executives ought to be a fundamental segment of any diabetes anticipation plan (Honnalli, 2012). The World Health Organization (WHO) Consultation in 1999 gave the primary working meaning of the MS, the American College of Endocrinology (ACE), and all the more as of late the International Diabetes Federation (IDF) (Hwang et al., 2009).

MATERIALS AND METHODS

Source of data

All the patients aged > 18 years with newly detected Type 2 Diabetes Mellitus (< 6 months duration) admitted in Krishna Institute of Medical Sciences.

Inclusion criteria

Type 2 Diabetes Mellitus detected < 6 months both sexes
Age 18 years and above

Sample size

100 patients

Exclusion criteria

Type 2 Diabetes Mellitus > 6 months

RESULTS

In this study, (Table 1) out of 100 newly detected diabetic patients males were 42, and females were 58.

Table 2 Among 42 newly detected male patients, 38 patients (90%) and out of 58 females, 48(82.7%) were predicting metabolic syndrome, i.e. fulling clinical and anthropometrical criteria for Metabolic Syndrome. So males were predicting Metabolic Syndrome more when compared to females. The sex ratio of male to female is 1:1.3.

Table 3 reveals that By considering different criteria’s for metabolic syndrome, results showed that modified NCEP ATP III predicted a maximum number of Metabolic Syndrome in newly detected diabetes when compared to other criteria. Modified NCEP ATP III predicted MS in 60 patients(70%) and IDF criteria predicted MS in 40(46%) patients who are least compared to others. Modified WHO and NCEP ATP III criteria were predicting MS 55(64%), 48(56%) respectively.

In respect to age consideration, 45 patients were in the age group of 30-49 yrs, 36 patients in 50-59 yrs,12 patients in 60-69 yrs and 7 patients in more than 70 years. Mean, and SD of age (male) is 48.1±10.23. Mean, and SD of age (female) is 49.63±11.2. Mean age of all patients is 49.15 comparing this age among male and female Z - 0.53, p<0.05 (Table 4).

Table 5 showed that the age group 30-49 yrs, 38 patients(44%) were predicting MS, and 6 patients (7%) were predicting MS for more than 70 years. 33 patients(38.4%) and 9 patients (10.5%) were in the group 50-59 years and 60-69 years respectively predicting MS. Our study showed more number of newly detected diabetes predicting MS were 30-49 years and least in more than 70 years. Mean age of male is 47.23±9.82, mean age of the female is 49.68±10.71, mean age of all cases is 48.60±10.48. Comparing this age among male and female Z = 1.10, p<0.05.

In our study, 18 patients have detected DM at the time of admission, 28 patients had since 1-3 months, and 54 patients had 4-6 months. Our study suggested that more number of patients had a history of DM 4-6 months. Mean duration of DM of male and female is 3.06±1.32 months and 3.43±1.43 months, respectively. Mean duration of all cases is 3.27±1.31 months. Comparing among male and female Z=1.37, p<0.05 (Table 6).

Table 7 reveals that by analyzing various individual parameters of MS in newly detected DM patients, high Triglycerides were present in 68(79%) patients(male-39,female-29) followed by raised...
### Table 1: Newly detected diabetes mellitus

| Gender | No. of cases | Percent |
|--------|--------------|---------|
| Male   | 42           | 42.00   |
| Female | 58           | 58.00   |

### Table 2: Patients predicting metabolic syndrome

| Gender | No. of Patients |
|--------|----------------|
| Male   | 38 (44.18%)    |
| Female | 48 (55.82%)    |
| Total  | 86             |

### Table 3: Patients predicting MS based on different criteria

| Criteria                  | Total          | Male          | Female         | Sensitivity and Specificity |
|---------------------------|----------------|---------------|----------------|----------------------------|
| Modified WHO              | 55 (63.95%)    | 25 (29%)      | 30 (35%)       | Sen-64% Spe-58%            |
| NCEP ATP III              | 48 (55.81%)    | 22 (25.6%)    | 26 (30.2%)     | Sen-56% Spe-52%            |
| Modified NCEP ATP III     | 60 (69.76%)    | 27 (31.5%)    | 33 (38.5%)     | Sen-69.76% Spe-62%         |
| IDF                       | 40 (46.51%)    | 16 (18.6%)    | 24 (27.9%)     | Sen-46.5% Spe-43%          |

### Table 4: DM detection at different age group

| Age          | Male      | Female    | Total |
|--------------|-----------|-----------|-------|
| 30-49        | 20 (20%)  | 25 (25%)  | 45 (45%) |
| 50-59        | 14 (14%)  | 22 (22%)  | 36 (36%) |
| 60-69        | 05 (5%)   | 07 (7%)   | 12 (12%) |
| > 70         | 03 (3%)   | 04 (4%)   | 07 (7%)  |
| Total        | 42(42%)   | 58(58%)   | 100(100%) |

### Table 5: Predicting MS at different age group

| Age          | Male      | Female    | Total |
|--------------|-----------|-----------|-------|
| 30-49 Yrs    | 19 (22%)  | 19(22%)   | 38 (44%) |
| 50-59 Yrs    | 14 (16.3%)| 19 (22%)  | 33 (38.4%)|
| 60-69 Yrs    | 03 (3.5%) | 06 (07%)  | 09 (10.5%)|
| >70 Yrs      | 02 (2.3%) | 04 (4.6%) | 06 (07%)  |
| Total        | 38(44.2%) | 48(55.8%) | 86(100%)  |

### Table 6: Duration of DM

| Duration            | Male     | Female    | Total |
|---------------------|----------|-----------|-------|
| At the time of admission | 08 (8%)  | 10 (10%)  | 18 (18%)  |
| 1-3 months          | 14 (14%) | 14 (14%)  | 28 (28%)  |
| 4-6 months          | 20 (20%) | 34 (34%)  | 54 (54%)  |
Table 7: Various single parameters predictors of metabolic syndrome

| Parameter                  | Male         | Female       | Total        | Mean±SD     |
|----------------------------|--------------|--------------|--------------|-------------|
| Systolic blood pressure    | 29(33.7%)    | 29(33.7%)    | 58(67.4%)    | 132.45±16.32|
| Fasting blood glucose      | 30(34.9%)    | 25(29%)      | 55(64%)      | 186.13±64.3 |
| High density lipoprotein   | 14(16.3%)    | 39(45.3%)    | 53(61.6%)    | 42.48±9.18  |
| Triglyceride               | 39(45.3%)    | 29(33.7%)    | 68(79%)      | 200.02±89.48|
| Waist circumference        | 20(23.3%)    | 24(28%)      | 44(51.2%)    | 94.67±10.83 |
| Waist hip ratio            | 16(18.7%)    | 24(27.9%)    | 40(46.5%)    | 91.24±12.6  |
| Body mass index            | 16(18.7%)    | 24(27.9%)    | 40(46.5%)    | 27.42±5.12  |

SBP in 58(67.4%) patients (male-29, female-29). High fasting blood glucose was present in 55 patients, low HDL in 53 patients. Significant WC, waist-hip ratio and significant BMI was seen in 44, and 40 patients, respectively.

**Modified WHO criteria**

According to modified WHO criteria, Triglyceride was raised in maximum no - 48 patients (male-25, female-23), followed by raised SBP in 46 patients (male-18, female-28). However, comparing TG with other criteria, no significant difference is seen. (p>0.05)

**Modified NCEP-ATP III criteria**

In our study significantly decreased HDL was the most sensitive parameter of MS in modified NCEP ATP III criteria. Out of 54 patients (88.3%), 21 (33.3%) and 33 (55%) were males and females respectively. Decreased HDL was followed by, high FBS is seen in 49 patients.

**NCEP ATP III criteria**

SBP and HDL were highest and equal in several patients of MS by NCEP ATP III criteria. In which 18 males and 24 females had raised SBP and every 21 patients male and female had reduced HDL.

**IDF criteria**

All the 40 patients of IDF criteria had significant waist-hip ratio and increased waist circumference in which 16(40%) were males, and 24(60%) were females.

**DISCUSSION**

In our study 100 pts of newly detected diabetes mellitus were included, among these 18 patients were detected as newly DM, at the time of admission, 28 patients had 1-3 months history of DM and 54 patients had 4-6 months history of DM. Among 100 newly detected DM patients, 42 (42%) were males, and 58 (58%) were females.

Our study showed the prevalence of metabolic syndrome varies from 46.95% (IDF) to 69.76 % (Modified NCEP ATP III), by different criteria, in newly detected DM type 2 individuals. Prevalence of MS was 55.81% and 63.95 % according to NCEP ATP III and modified WHO respectively.

Carole et al., study using modified WHO, NCEP ATP III and IDF criteria showed 38 %, 61%, and 54 % respectively. Thus comparing this study results were almost equal in respective NCEP ATP III, and IDF criteria. But the difference was seen with modified WHO criteria (Cull et al., 2007).

Charles et al. study was predicting 43.5 % of MS according to NCEP ATP III criteria in newly detected type 2 DM whereas our study is predicting 55.81% of patients (Lorenzo et al., 2003).

Carole’s et al. study was predicting less number of MS in newly detected DM patients according to modified WHO (41.3%), NCEP ATP 111(48.7%) criteria, when compared to our study with the same criteria (Alexander et al., 2003).

In our study with comparison to men, the prevalence of MS was higher in women according to all 4 criteria’s. 29 % vs. 35%, 25.6 % Vs 30.2 %, 31.4% vs 38.4% and 18.6% Vs 27.9 % according to modified WHO, NCEP ATP III, Modified NCEP ATP III and IDF criteria respectively.

Carlos et al. study showed 39 % of males were predicting MS according to WHO criteria in Diabetic patients, whereas our study showed 29% (de Simone et al., 2007).

Giovanni study results showed an almost equal number of patients of men and women predicting MS according to modified WHO but the study had similar results showing women predicting high prevalence compared to men with respective to NCEP ATP 111 and IDF criteria (Church et al., 2009).

In our study, the age of the newly detected type 2 DM patients included was 30 years to 73 years. The maximum number of patients were in the age group of 30-49 years (45%) predicting MS 44%. And minimum in the age group of more than 70 years (7%)
predicting MS 7%. Age between 50-59 years was 36% predicting MS 38.4% and 60-69 years were 12 % predicting MS 10.5%. Mean age in our study was 49.15 years predicting metabolic syndrome in newly detected type 2 DM in this region.

The study was showing a mean age of 52.4 years with MS and type 2 DM, 46.8 years with only MS and 49.2 years with only type 2 DM (Church et al., 2009). Alexander et al. (2003) studied MS with type 2 DM only in the age group of more than 50 years, and the mean age was 65.5 years.

Lorenzo et al. (2003) study had a mean age of 47.7 years. When considering the single strongest predictor for MS in newly diagnosed type 2 DM. In our study Triglyceride was showing in 79% of patients which was maximum compared to SBP (67.4%), FBS (64%), HDL (61.6%), WC (51.2%), Obesity (46.5%) and BMI (46.5%). It was FBS (90.2%) which was the single strongest predictor for MS in type 2 DM compared to WC (86%), SBP (72%), HDL (69.7%), BMI (30.9%) (Lorenzo et al., 2003). So, This study has almost similar results to our study concerning HDL, TG but variations seen in respect to SBP and FBS.

Ley et al. (2009) study result showing HDL and WC both had maximum predictor each 53 % and FBS 21% the lowest predictor for MS by applying NCEP ATP III criteria, whereas in our study SBP and HDL showing 87.5 % each prediction for MS and WC (70.8%) showing the lowest prediction for MS by NCEP ATP III criteria.

The single parameter with relation to sex

When considering single parameter for MS in newly detected type 2 DM and comparing in between male and female, our study result showed TG for men in 45.3 % and low HDL for female in 45.3 % where single strongest predictor for MS. Whereas TG for females was 33.7 %, SBP was 33.7%, WC 28 %, significant waist/hip ratio in %. Compared to males, SBP was equal to females, HDL C was low (16.3%), WC (23.3%), central obesity in 18.6%), almost all the single predictors were less compared to females, BMI in 27.9 % and 18.6 % for females and males respectively.

Our study result showed SBP in 50.9 % for females, TG in 45.4% where single strongest predictor according to modified WHO criteria, low HDL in 55% for females, FBS in 36.7 % in males were strong predictors according to modified NCEP ATP III. SBP in 50 % for females, TG, HDL, and FBS all in 43.8% for men had maximum prediction according to NCEP ATP III. Excess weight was the primary underlying contributors to the development of MS in women.

CONCLUSION

Raised serum TG for men and lessened HDL for women were most grounded single pointers, satisfactorily exhibiting the presence of MS in as of late distinguished sort 2 DM patients.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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