

A Study On Metabolic Syndrome With Diabetes Mellitus

Dr. Suhail Bin Ahmed¹, Mohd Ansaruddin Zoheb²

¹Department of General Medicine Associate professor College: Deccan college of medical sciences. Address: H.no : 9-4-62/30/1, Nizam Colony, Near Masjid, Tolichowki, Hyderabad, Telangana. 500008

²Assistant professor Department of General Medicine Deccan college of medical sciences. Email id: dr.md.zoheb@gmail.com, corresponding author

DOI: 10.47750/pnr.2023.14.S02.178

Abstract

Background

Metabolic syndrome is a cluster of abnormalities which is characterized by hyperglycaemia. This study was mainly undertaken in order to study the burden of metabolic syndrome in newly detected type 2 diabetes mellitus cases.

Material and Methods

A case control study was conducted in 50 cases and 50 controls in a tertiary care centre. The cases included newly diagnosed type 2 diabetes mellitus cases. The metabolic syndrome was diagnosed by modified WHO criteria including fasting blood glucose (FBG), 2 hour post prandial blood sugar (2 hr PPBS), glycated haemoglobin (HbA_{1c}), waist circumference (WC), hip circumference (HC), Height (H), Weight (W), high density lipoprotein cholesterol (HDL-C) and low-density lipoprotein (LDL-C), triglycerides (TG), systolic blood pressure (SBP) and diastolic blood pressure (DBP), body mass index, serum creatinine were estimated. At the baseline the blood samples were taken after minimum 6 hours overnight fasting.

Results

The prevalence of metabolic syndrome was 22.0% in newly diagnosed diabetes cases and 14.0% of the controls. This study had shown that, 18.0% of the newly diagnosed diabetics and 98.0% of the controls were physically active. There was statistically significant difference in the fasting blood sugar levels and HbA_{1c}. There was no statistically significant difference in the triglyceride level, total cholesterol, HDL, LDL and VLDL levels. A statistically significant difference was observed in the microalbumin levels between the cases and controls.

Conclusion

This study concluded that, the metabolic syndrome was significantly higher in newly detected diabetes mellitus patients when compared to controls.

Key words: Metabolic syndrome, Diabetes mellitus, Hyperlipidaemia, Blood pressure, HbA_{1c}

INTRODUCTION

Metabolic syndrome is a cluster of metabolic abnormalities which coexist and leads to a marked increase in the risk of cardiovascular disease and type 2 diabetes mellitus including obesity, hyperglycaemia, dyslipidaemia and hypertension.¹ The literature has shown a strong association of incident diabetes mellitus with the metabolic syndrome. Some researchers feel that keeping the risk factors separated for purposes of clinical management but others believe that identifying individuals with an aggregation of risk factors provides the additional information to the lead the clinical management. This necessitates the characterization of the metabolic syndrome among

patients with diabetes for multiple risk reduction including the lifestyle factors with the ultimate purpose of preventing cardiovascular disease.²

Early identification and effective prevention of metabolic syndrome will alter the life course of various chronic conditions reducing morbidity and hence mortality. Hence, this study was undertaken in a tertiary care hospital to detect the burden of metabolic syndrome among the newly detected type 2 Diabetes mellitus cases.

MATERIAL AND METHODS

A case control study was undertaken in the outpatient department of the General Medicine of a Tertiary care hospital. A total of 50 cases of metabolic syndrome in newly detected type 2 diabetes mellitus were compared with 50 non-diabetes mellitus cases for a period of two years. The sample size was calculated on the basis of available literature where the prevalence of metabolic syndrome was 66.2% with newly diagnosed type 2 diabetes mellitus cases, at a confidence interval of 95% and allowable error of 20%. Out patient cases presenting with newly diagnosed type 2 diabetes mellitus and of 30 – 60 years of age were included in to the study. The patients under palliative cases and patients with type 1 diabetes mellitus and gestational diabetes mellitus were excluded from the study.

The metabolic syndrome was diagnosed according to modified WHO criteria including fasting blood glucose (FBG), 2 hour post prandial blood sugar (2 hr PPBS), glycated haemoglobin (HbA_{1c}), waist circumference (WC), hip circumference (HC), Height (H), Weight (W), high density lipoprotein cholesterol (HDL-C) and low density lipoprotein (LDL-C), triglycerides (TG), systolic blood pressure (SBP) and diastolic blood pressure (DBP), body mass index, serum creatinine were estimated. At the baseline the blood samples were taken after minimum 6 hours overnight fasting.

The data thus collected was entered in a predesigned proforma and entered and analysed using statistical Package for social services (SPSS vs 20).

RESULTS

Table 1. Distribution of the study group according to socio – demographic characteristics

		Newly diagnosed type 2 DM n (%)	Non-diabetics n (%)	P value, Sig
Metabolic syndrome	Absent	39 (78.0)	43 (86.0)	0.298, NS
	Present	11 (22.0)	7 (14.0)	
Age	Mean years (± SD)	53.8 (± 9.08)	48.76 (±8.86)	0.006, Sig
Sex	Males %	50.0	54.0	0.689, NS
Alcohol	Alcoholics %	12.0	10.0	0.749, NS
Smoking	Smokers %	26.0	22.0	0.247, NS
Physical activity	Physically active %	18.0	98.0	0.000, Sig
Family history	Present	42.0	14.0	0.002, Sig

Metabolic syndrome was present in 22.0% of the newly diagnosed diabetics and 14.0% of the controls in this study. There was a statistically significant difference in age. Males constituted 50.0% of the newly diagnosed diabetics and 54.0% of the controls. Around 18.0% of the newly diagnosed diabetics and 98.0% of the controls were physically active. Family history of diabetes was present in 42.0% of the newly diagnosed diabetics and 14.0% of the controls.

Table 2. Distribution of the study group according to Anthropometric measurements

Anthropometric measurements	Newly diagnosed type 2 DM	Non-diabetics	T value	P value, Sig
Body Mass Index	25.9 ± 3.8	24.9 ± 4.17	1.248	0.215, NS

Waist: Hip Ratio	0.96± 0.11	0.92 ± 0.07	1.622	0.108, NS
-------------------------	------------	-------------	-------	-----------

The body mass index was slightly higher in newly diagnosed diabetics but it was not statistically significant. The waist hip ratio was higher in newly diagnosed diabetics when compared to non-diabetics.

Table 3. Distribution of the study group according to Clinical and laboratory parameters

Laboratory parameters	Newly diagnosed type 2 DM	Non-diabetics	T value	P value, Sig
Fasting blood sugar	188.8 ± 69.57	103.64 ± 26.17	8.102	0.000, Sig
HbA_{1c}	8.79 ± 1.69	5.08 ± 0.56	14.681	0.000, Sig
Total Cholesterol	189.94 ± 56.5	187.94 ± 51.3	0.185	0.853, NS
Triglycerides	150.68 ± 45.11	153.32 ± 63.3	0.240	0.811, NS
HDL	36.62 ± 6.1	37.58 ± 5.8	0.807	0.422, NS
LDL	123.12 ± 55.45	119.56 ± 54.84	0.323	0.748, NS
VLDL	30.13 ± 9.02	30.66 ± 12.67	0.24	0.811, NS
Microalbumin	98.78 ± 51.23	18.06 ± 12.35	10.831	0.000, Sig
Creatinine	1.05 ± 0.77	1.19 ± 0.78	0.956	0.341, NS
Blood urea nitrogen	21.6 ± 11.52	19.92 ± 11.56	0.728	0.468, NS
Glomerular filtration rate	86.6 ± 20.4	86.06 ± 20.25	0.133	0.895, NS

The fasting blood sugar levels were significantly higher in newly diagnosed diabetics in this study. The HbA_{1c} levels was 8.79% in newly diagnosed diabetics when compared to controls. The total cholesterol, Triglycerides, HDL, LDL and VLDL were not significantly different in newly diagnosed diabetics in compared with controls. The microalbumin excretion was significantly higher in newly diagnosed diabetics in this study. The Serum creatinine, blood urea nitrogen and glomerular filtration rate were not significantly different in newly diagnosed diabetics when compared to controls.

DISCUSSION

Metabolic syndrome increases the risk of cardiovascular diseases in type 2 diabetes mellitus patients including obesity, hyperglycaemia, dyslipidaemia and hypertension.¹ This study was mainly undertaken to study the presence of metabolic syndrome in newly detected diabetes mellitus cases and other biochemical parameters. This study had shown a prevalence of metabolic syndrome of 22.0% of the newly diagnosed cases and 14.0% of the controls. Nahar et al had noted a prevalence of 73.5% in newly diagnosed diabetes mellitus cases according to NCEP ATP III criteria, 81.0% according to modified NCEP ATP III criteria, 82.5% according to modified WHO criteria and 61.0% according to IDF criteria.³ A study by Thorat et al had reported the prevalence of metabolic syndrome as 63.95% according modified WHO criteria, 55.81% according to NCEP ATP III criteria, 69.76% according to modified NCEP ATP III criteria and 46.51% according to IDF criteria.⁴ Osuji et al reported a prevalence of 66.7% according to NCEP ATP III criteria in newly detected diabetes mellitus cases.⁵

The age in this study was significantly higher in this study and there was no sexual predilection in occurrence of diabetes mellitus. The newly diagnosed diabetics had significantly lower physical activity in the newly diagnosed diabetes mellitus. The family history of diabetes mellitus was higher in newly diagnosed diabetes mellitus cases. Studies by Thorat et al⁴, Jacob et al⁶ and Osuji et al⁵ also noted similar findings.

This study had shown that, the fasting blood sugar levels were significantly higher in newly diagnosed diabetics. The HbA_{1c} levels were significantly higher in newly diagnosed diabetes mellitus cases. Thorat et al also noted similar findings.⁴

The total cholesterol, triglycerides, HDL, LDL and VLDL were not significantly different between the cases and controls. Similar findings were also noted by Nahar et al³, Thorat et al⁴, Osuji et al⁵ and Jacob et al⁶.

The microalbumin excretion was higher in newly diagnosed diabetics in this study. The serum creatinine, blood urea and glomerular filtration rate was not statistically significant between the cases and controls.

CONCLUSION

This study concludes that, the metabolic syndrome was significantly higher in newly detected diabetes mellitus patients when compared to controls.

REFERENCES

1. Khosravi A, Sadeghi M, Barghikar M. Which Components of Metabolic Syndrome have a Greater Effect on Mortality, CVA and Myocardial Infarction, Hyperglycemia, High Blood Pressure or Both? *Advanced Biomedical Research*. 2017; 6:121.
2. Shin JA, Lee JH, Lim SY et al., "Metabolic syndrome as a predictor of type 2 diabetes, and its clinical interpretations and usefulness," *Journal of Diabetes Investigation*:2013; 4: 334–343.
3. Nahar S, Rahman MA, Ullah M et al, Prevalence of metabolic syndrome in newly diagnosed type 2 diabetes mellitus, *Cardiovasc. j*. 2011; 4(1): 17-25.
4. Thorat ST, Patil OR, Kondewar M, A study of prevalence of metabolic syndrome in newly detected diabetes mellitus type 2. *MedPulse International Journal of Medicine*. 2017: Nov 4: 2: 74 – 78.
5. Osuji CU, Nzerem BA, Dioka CE, Onwubuya EI. Metabolic syndrome in newly diagnosed type 2 diabetes mellitus using NCEP-ATP III, the Nnewi experience. *Niger J Clin Pract*. 2012 Oct-Dec;15(4):475-80.
6. Jacob R, Arnold LD, Hunleth J, Greiner KA, James AS. Daily Hassles' Role in Health Seeking Behavior among Low-income Populations. *Am J Health Behavior* 2014;38:297–306.