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The Comparative Study Of Biochemical Parameters In Metabolic Syndrome And Non Metabolic Syndrome In Diabetic Renal Disease Patients In Tertiary Care Centre Of Rajasthan, India

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ABSTRACT
Objective: To compare biochemical parameters in metabolic syndrome and non metabolic syndrome of DKD.
Method: This study was conducted on 400 subjects of DKD at Government Medical College and associated groups of hospitals Kota, Rajasthan from September 2019 to August 2021.Patients diagnosed with both DM-2 and CKD, as per the criteria were included in our study, in which eGFR ≤60mg/ml/1.73m2. This study group has 107 cases of Non-MS and 293 cases of MS.
Result and discussion: We observed a significant rise in blood sugar, total cholesterol , serum triglyceride in metabolic syndrome patients compared to non-metabolic syndrome patients. Study shows, only serum HDL decreases in MS as compared to Non- MS .
Conclusion: . Biochemical parameters shows fasting blood sugar, serum triglyceride, serum cholesterol is significantly increases in metabolic syndrome cases with decreased level of serum HDL in metabolic syndrome as compared to non metabolic syndrome .
Keywords: *HDL-High Density Lipoprotein, GFR-Glomerular Filtration Rate, CKD-Chronic kidney Disease, DM-Diabetes Mellitus, MS-Metabolic Syndrome.*

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I. INTRODUCTION:

Metabolic syndrome is thus described as cluster of cardiovascular risk factors for example hypertension, obesity, dyslipidemia etc. also there is increased mortality in individuals with low risk cardiovascular profile (1).

Risk factors of Metabolic syndrome are over consumption of energy supplements and sedentary life style ;which is more common in developing countries. Also it has been observed that high waist circumference is correlated with reduced estimated GFR and microalbuminuria besides hypertension and hyperglycemia. Hence, Metabolic syndrome and components may have adverse effect on patient ;as per National Cholesterol Education Program - Adult Treatment Panel III (NCEP - ATP III) criteria, the presence of two or more criteria besides NIDDM: a) high blood pressure: ≥130/85 mmHg and/or on anti-hypertensive medicine; b) triglycerides ≥150 mg/dL; c) HDL <40 mg/ dL in males or HDL <50 mg/dL in females, and d) obesity: waist circumference>102 cm in males or >88 cm in females (9)

Diabetic renal disease is not only the main cause of end-stage renal disease but also plays a major role as a risk factor for the development of cardiovascular disease . Although best known consequences of diabetic renal disease is end stage renal disease, the majority of mortality in patients occur from cardiovascular disease, and one of the main risk factors for cardio vascular disease in both diabetes mellitus-2 and chronic renal disease is hyperlipidemia. (2)(3)

II. Material and Methods:

This study was conducted on 400 subjects of diabetic renal disease at Government Medical College and associated groups of hospitals, kota , rajasthan. The patients and study design approval was taken by the institutional ethical committee .

This study group has confirmed cases of type 2 diabetes mellitus contains 107 cases of non metabolic syndrome and 293 cases of metabolic syndrome as confirmed by using NCEP ATP III criteria of metabolic syndrome

Exclusion criteria: Subjects with type I diabetes mellitus, acute kidney injury, known renal transplant, history of hematuria, symptomatic urinary tract infection, pregnant women, Patients diagnosed with chronic renal disease before onset of type2 Diabetes Mellitus, Undergoing treatment with oral antidiabetic drug and antihypertensive drugs.

Inclusion criteria: Patients diagnosed with both DM-2 and CKD, as per the criteria were included in our study, in which eGFR ≤60mg/ml/1.73m2

The biochemical parameters listed above were calculated using photometric principles on a fully automated biochemistry analyzer, the XL-640 (Transasia Bio-Medicals Ltd, Mumbai, India).All the autoanalysers were pre calibrated and quality controls were done timely as advised by the concerned manufacturers.

• GFR was calculated by Modification of Diet in Renal Disease (MDRD) equation [4]:

eGFR (mL/min/1.73 m2)=175 × [Serum Creatinine (µmol/L)] $^{-1.154}$ × age (years) $^{-0.203}$× 0.742 (if female).When serum creatinine is in mg/dL: eGFR (mL/min/1.73 m^2) = 186 x (Serum creatinine) $^{-1.154}$ x (Age) $^{-0.203}$ x (0.742 if female)

Results obtained are represented as mean ±SD . All the statistical analysis was performed using graphpad prism Ver. 6.0 in which if (*P<0.05) ,(**P<0.01).

S. No.		Non metabolic syndrome (N)	Mean	SD	Metabolic syndrome (N)	Mean	SD	p value	t value
1	Overall	107	56.48	7.69	293	59.01	9.61	0.0147 *	2.4511
2	Male	57	57.03	7.54	79	58.21	10.75	0.4779	0.7117
3	Female	50	55.83	7.77	214	59.29	9.15	0.014 *	2.4727

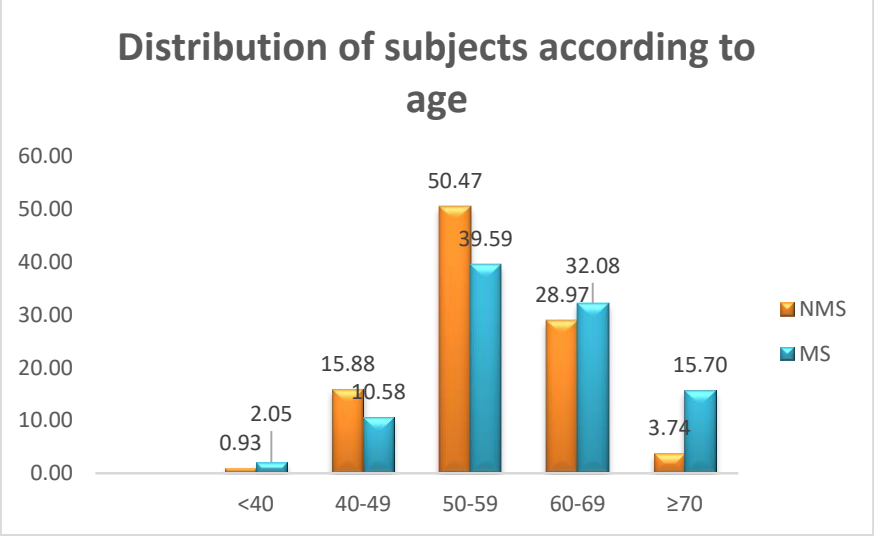
III. RESULT:

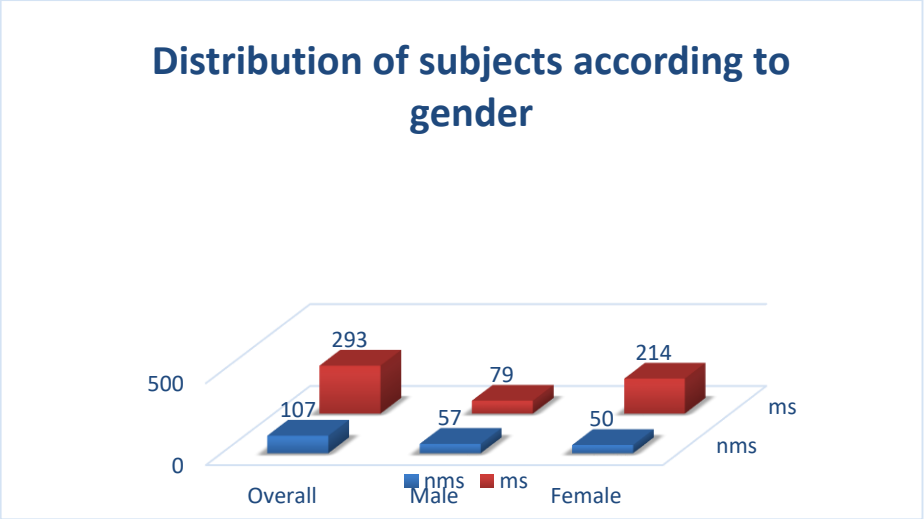
Table1: Distribution of age in study subjects in percentage based on metabolic and non metabolic syndrome cases

Table2: Comparison of age between the study groups

S.No.	Age (in years)	NMS (n=107)		MS (n=293)	
		N	%	N	%
1	<40	1	0.93	6	2.05
2	40-49	17	15.89	31	10.58
3	50-59	54	50.47	116	39.59
4	60-69	31	28.97	94	32.08
5	≥70	4	3.74	46	15.70

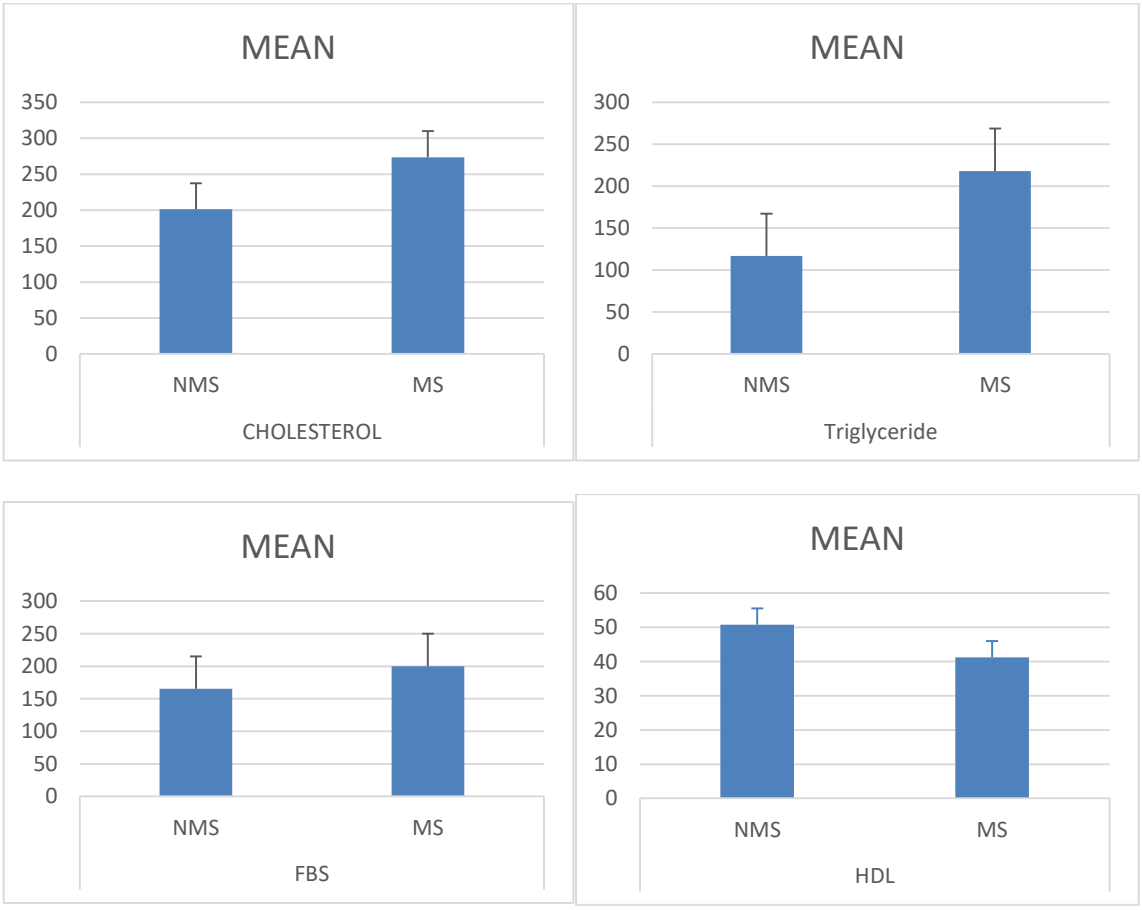
Datas are expressed as mean with standard deviation unpaired t test was used to test the level of significance.





S. No.	Parameters	NMS gp (n=107)		MS gp (n=293)		t value
		Mean	SD	Mean	SD	
1	Fasting Blood Sugar(mg/dl)	165.3	52.42	200	72.46	4.583**
2	Serum Triglyceride (mg/dl)	116.79	55.93	226.59	52.16	18.2754**
3	Serum Cholesterol (mg/dl)	201.19	34.33	274.14	113.8	6.5189**
4	Serum HDL (mg/dl)	50.76	9.01	41.23	14.47	6.3735**

Comparison of biochemical parameters in non metabolic syndrome with metabolic syndrome cases



IV. DISCUSSION:

The present observational study was conducted on 107 cases of non metabolic syndrome with 293 cases of metabolic syndrome cases in diabetic renal disease attended in department of nephrology, Government Medical college Kota, Rajasthan. . The non metabolic syndrome cases had mean of age (56.48± 7.69) as compared with (59.01±9.61) in metabolic syndrome cases. In non-metabolic syndrome participants, 49 were female and the remaining 58 were male. In the metabolic syndrome participants, 214 were female and the remaining 79 were male. And the biochemical parameters shows the significant rise in serum blood sugar (200 ±72.46), serum triglyceride (218±129.11), serum cholesterol (274.14±113.8) and significant lower level of serum HDL (41.23±14.47) compared to serum blood sugar (165.30 ±52.42), serum triglyceride (116.79±55.93), serum cholesterol (201.19±34.33) and serum HDL (50.76±9.01) of non metabolic syndrome. Where some studies reported here in Yoonjin Park et al.(5,6) reported in 2022 that middle-aged diabetics with an eGFR of 90 mL/min/1.73 m2 had significant variations in their risk for metabolic syndrome based on gender, age, disease duration, and total cholesterol concentrations. Men's systolic blood pressure and waist circumference, and women's waist circumference and HDL-C level, have been identified as risk factors for the rising incidence of metabolic syndrome. **Lym et al.** (7)examined metabolic-syndrome-related risk factors in Korean adults using the ATP III diagnostic criteria and discovered that the prevalence of metabolic syndrome was high in men with high blood pressure and high waist circumference, but not in women with high blood pressure, high waist circumference, and low HDL-C levels [40]. **Alberti KG et al(8)** study that employed the ATP III criteria in individuals without ESRD found that MetS was related with older age and female sex [3].

V. CONCLUSION:

In this study, we selected patients of diabetic renal disease having eGFR ≤60 mg/ml/1.73m^2 in confirmed case of type2 diabetes mellitus in which we found that majority of cases are found in females of metabolic syndrome. Biochemical parameters shows fasting blood sugar, serum triglyceride, serum cholesterol is significantly increases in metabolic syndrome cases with decreased level of serum HDL in metabolic syndrome as compared to non-metabolic syndrome. So, we conclude that the hyperlipidaemia is significantly associated with CVD in diabetes renal disease.

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