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### STUDY OF HYPERGLYCEMIA IN NIDDM INDIVIDUALS BY HBA1C & MICRO ALBUMINURIA

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**Abstract:** Diabetes mellitus is a group of metabolic disorder carbohydrate metabolism in which glucose is under used producing hyperglycemia. As the disease progresses patients are at increased risk of development of specific complications including retinopathy, leading to blindness, nephropathy leading to renal failure, neuropathy, and atherosclerosis. Present study planned to review the degree of association between HbA1c, Micro albuminuria & other parameters like T. Cholesterol and Triglycerides, HDL cholesterol. Present Study includes 50 cases (Males and Females) With NIDDM and 15 metabolically healthy individuals (Both sexes). All the individuals included are between the age group of 30-70 yrs. All the cases were chosen from the O.P of Government General hospital, Vijayawada. In all these patients HbA1c and Micro albuminuria levels estimated with detailed history regarding complications of Diabetes noted. The incidence of dyslipidemia is noted in these individuals. There is increased incidence of micro albuminuria in smokers, alcoholics and Hypertensive individuals of NIDDM patients Majority of them having Dyslipidemia.

**Keywords:** Type II Diabetes mellitus, HbA1c, Micro albuminuria.



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## INTRODUCTION

Diabetes Mellitus is a syndrome characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism associated with absolute or relative deficiencies in insulin secretion and/ or insulin action. Diabetes mellitus is a group of metabolic disorder of carbohydrate metabolism in which glucose is under used producing hyperglycemia. As the disease progresses patients are at increased risk of development of specific complications including retinopathy, leading to blindness, nephropathy leading to renal failure, neuropathy, and atherosclerosis.

In 1987 the prevalence of diagnosed diabetes was 6.8 million .In 1995 prevalence of diabetes in adults was estimated to be 4% .In 2001 the CDC which estimated the prevalence of Diabetes is 7.9% equivalent to 16.7 million .In 2005 the Diabetes effects 300 million adults which is greater than 75% of who are living in the developing countries. This large increasing in the diabetes has been observed globally. These statistics revealed that the diabetes being described as one of the main threats to human health in the 21 century.

The measurement of blood glucose remains the most important laboratory test in diabetes. But its inherent drawback is that it may change very quickly. A major advance in the laboratory monitoring of the diabetic patient has been the introduction of the measurement of glucose-modified hemoglobin. (Glycosilated haemoglobin). Measurement of glycated haemoglobin is effective in monitoring long-term glucose control in people with diabetes mellitus. It provides a retrospective index of the integrated plasma values over an extended period of time and is not subjected to the wide fluctuations as observed when measuring the blood glucose concentration. It is a valuable and widely used adjunct to the blood glucose determination in the assessment of glycemic control. Along with HbA1C estimation micro albuminuria is valuable in monitoring diabetes mellitus, which helps to identify the increased risk of renal disease and cardiovascular mortality

The present study was planned to review the degree of association between HbA1C & micro albuminuria along with other parameters by a random survey of 50 patients of Type II Diabetes mellitus. The relationship between micro albuminuria with Hypertension, cardiovascular disease in these patients was also studied. Incidentally there were few smokers and alcoholics among them. So I also studied the incidence of micro albuminuria in them. Hypertension in diabetes increases incidence of retinopathy, increases incidence of renal disease and also increase progression of micro vascular disease.

### MATERIALS AND METHODS:

Present Study includes 50 cases (Males and females) With NIDDM and 15 metabolically healthy individuals (Both sexes). All the individuals included are between the age group of 30-70 yrs. All the cases were chosen from the OP of GGH, Vijayawada. Detailed case history was taken from both the groups regarding their habits, family history of Diabetes, duration of Diabetes Complications like Hypertension, Neuropathy and Cardiovascular disease.

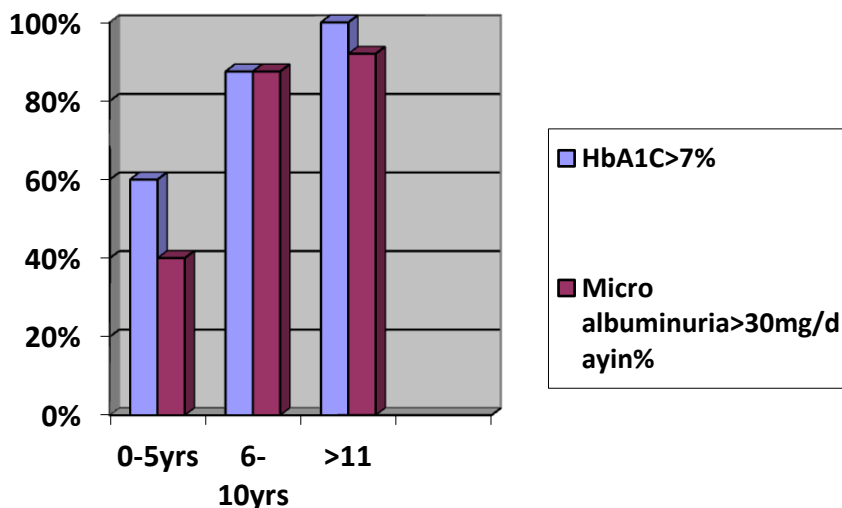
The Following Bio-chemical parameters were included along with HbA1C and Micro albuminuria.

1. Fasting blood glucose by GOD-POD method
2. T.cholesterol by zlatkis, zak & boyles method
3. S.tryglycerides by GPO-POD with ESPAS method
4. HDL Cholesterol by CHOD/POD Phosphotungstate method

### RESULTS:

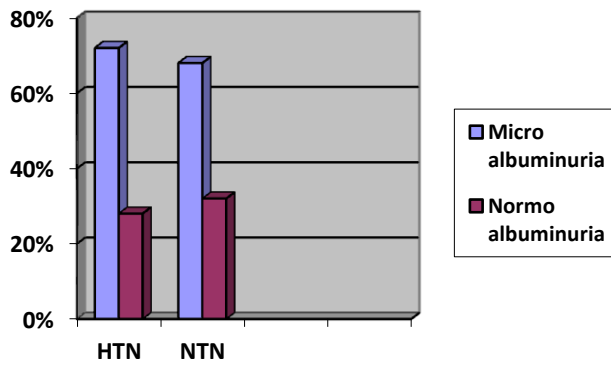
In this study 50 cases are NIDDM and 15 are sex matched apparently healthy normal subjects in the age group 30-70 yrs. The micro albuminuria is significantly more in type II diabetics than in controls. It is more than 30mg/day in diabetics.

### THE LEVELS OF HbA1C & MICRO ALBUMINURIA WITH DURATION OF DIABETES:



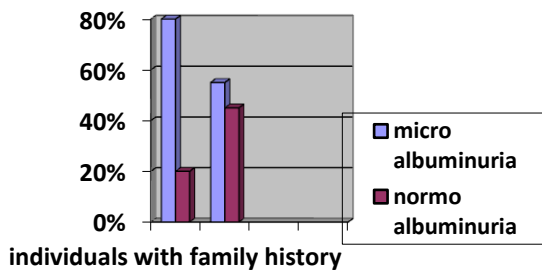
	0-5yrs	6-10yrs	>11yrs
HbA1C>7%	60%	86%	100%
Micro albuminuria>30mgs/day	40%	86%	92%

**Relationship between Hypertension & micro albuminuria**



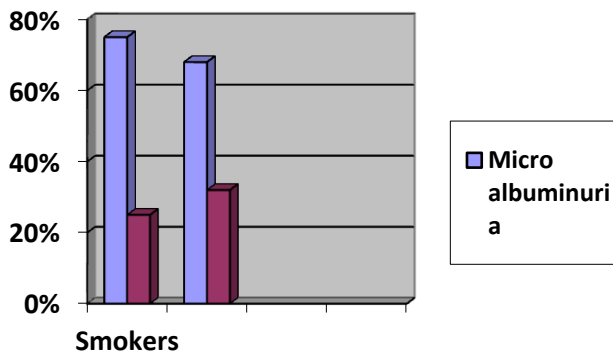
	Hypertensives	Normotensives
Micro albuminuria	72%	68%
Normo albuminuria	28%	32%

**Relationship between family history if DM & Micro albuminuria:**



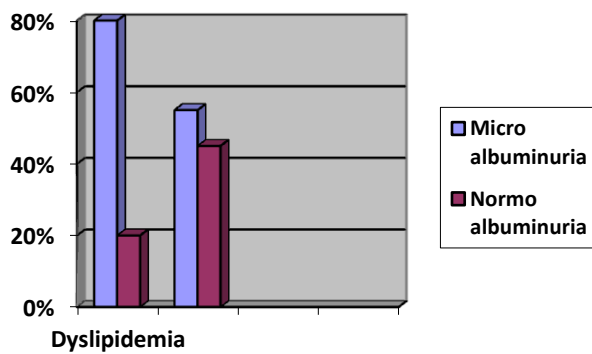
	Individuals with family history	Individuals without family history
Micro albuminuria	80%	55%
Normo albuminuria	20%	45%

**Relationship between Smoking & Micro albuminuria:**



	Smokers	Non smokers
Micro albuminuria	75%	32%
Normo albuminuria	25%	68%

**Relationship between Dyslipidemia& Micro albuminuria**



	Dyslipidemia	Normolipidemia
Micro albuminuria	80%	55%
Normo albuminuria	20%	45%

## DISCUSSION:

HbA1c has been firmly established as an index of long term blood glucose concentrations and as a measure of the risk for the development of complications in patients with diabetes. The DCCT documented that there is a direct relationship between blood glucose concentrations (assessed by HbA1C ) and the risk of complications. The absolute risks of retinopathy and nephropathy were directly proportional to the mean Hb A1C. The risk of retinopathy increased continuously. (David B.Sacks)

HbA1C was used as an index of the rate of non-enzymatic glycation of protein. When the risks for different complications associated with different HbA1C values are compounded over time, there are substantial differences in the incidence of complications appearing in patients with elevated HbA1C values. DCCT demonstrated HbA1c as a bench mark that even small decreases in HbA1C significantly reduce the rate of developing micro vascular complications. However as far as progression of micro albuminuria to overt proteinuria is concerned, HTN is the most crucial factor in elderly NIDDM patients.

Type II diabetics, the lower the average blood glucose level, the lower the rate of nephropathy, retinopathy and neuropathy. A high risk of kidney disease noticed in smokers. In our study there is an increased incidence of micro albuminuria in NIDDM smokers as compared to non-smokers. The ADA recommends that people aim for a HbA1C <7% (based on a normal level of 4 –6 %) DCCT data do not support the conjecture that a glycemic threshold for the development of complications exists at an HbA1C or that an HbA1C goal of 8% is maximally beneficial (Krolewski).

In present study we found that there is increased risk of developing micro albuminuria in patients with HbA1C levels >7%. In our present study there is positive correlation between increased levels of HbA1C and micro albuminuria. It is also seen in that people with family history of diabetes have higher incidence of micro albuminuria.

Micro albuminuria is a major predictor of future nephropathy in diabetes mellitus. It has been identified as predictor of micro vascular disease and mortality. Because of difficulty in dating the onset of NIDDM screening for albuminuria should be performed at the time of diagnosis of

these patients and annually thereafter. The development of Micro albuminuria in NIDDM patients is closely related to abnormality of lipid metabolism.

In present study there is increased incidence of Micro albuminuria in smokers, hypertensive individuals of NIDDM patients. Dyslipidemia (Triglycerides > 150mg & HDL < 35 mg) in Type11 DM is due to insulin resistance and obesity .Hypertriglyceridemia should not be delayed in patients with DM as this increase risk of CHD. In present study out of 50 NIDDM patients 30 are dyslipidemia state.

Prolonged hyperglycemia is a significant factor in causing micro albuminuria. Albumin is subject to non-enzymatic glycation at increased rates and induces microvasculature in glomerulus that may lead to endothelial dysfunction and nephropathy.

#### **CONCLUSION:**

There is positive correlation between the severity of NIDDM as determined by HbA1c and Micro albuminuria. Patients with HbA1c>7% have higher rate of incidence of Micro albuminuria than those with HbA1c <7%. Diabetic smokers have increased incidence of micro albuminuria when compared to non-smokers. Higher percentage of micro albuminuria was observed in subjects with in diabetics with Dyslipidemia. It is also seen that people with family history of diabetes have higher incidence of micro albuminuria than those without family history.

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