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Study on Levels of Microalbumin among Diabetics of Various Socioeconomic Group

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Abstract: *Diabetes is one of the most common endocrine disorders characterized by hyperglycaemia. Diabetic nephropathy is a consequence of long standing diabetes. The prevalence of microalbuminuria predicts progression to diabetic nephropathy. The present study was conducted to determine the prevalence of microalbuminuria in relation to economic status. Lots of studies have been conducted on the levels of microalbumin in a patient with diabetes mellitus. Since the role of this parameter is increasingly reviewed and evaluated, the need to carry out further such studies become obvious. The present study is thus designed to evaluate the role of microalbumin in predicting incipient nephropathy in diabetics of lower socioeconomic group so as to prevent the onset of overt nephropathy*

Materials and Methods*: This case descriptive study was carried out in a Silchar Medical College And Hospital from July2013 to july2014. One hundred known diabetic patients with age 21–90 years were included in the study. Informed consent and a structured questionnaire of each patient were recorded. Fasting venous blood and morning urine sample was collected for analysis of Fasting blood glucose, urinary microalbumin respectively. Statistical analysis was done using graph stat statistical software. All p-values <0.05 were considered as statistically significant.*

Results: *Urinary microalbumin, levels were very high in diabetic cases of lower socioeconomic group (p- value <0.05).*

Conclusion: *The present study found higher level of urinary microalbumin level in diabetics of lower socioeconomic group.*

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I. Introduction

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distinct types of DM exist and are caused by a complex interaction of genetics and environmental factors. Depending on the etiology of the DM, factors contributing to hyperglycemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production[1].

The worldwide prevalence of DM has risen dramatically over the past two decades, from an estimated 30 million cases in 1985 to 177 million in 2000. Based on current trends, more than 360 million individuals will have diabetes by the year 2030[1,2.] Globally, as of 2013, an estimated 382 million people have diabetes worldwide with type 2 diabetes making up about 90% of the cases[3.] This is equal to 3.3% of the population, with equal rates in both women and men[4] . In 2011 diabetes resulted in 1.4 million deaths worldwide, making it the 8th leading cause of death. In 2010, an estimated 227 to 285 million people had diabetes, with type 2 making up about 90% of the cases.[3,4.] This is equal to 3.3% of the population with equal rates in both women and men.[16] In 2011 it resulted in 1.4 million deaths worldwide making it the 8th leading cause of death. This is an increase from 1 million deaths in 2000[5] **.**

Diabetic Nephropathy is a common consequence of long standing diabetes mellitus. Its pathogenesis appears to be complex interactions between genetic and environmental factors[6]. The patho-physiologic basis for elevated urinary albumin excretion entails the binding of glucose to proteins resulting in excessive protein glycosylation with the build up of advanced glycated end products. This leads to deposition of advanced glycated end products on the glomerulus resulting in renal and glomerular hypertrophy, mesangial matrix accumulation and thickening of glomerular basement membrane[7]. This abnormality permits the leakage of low molecular weight proteins (albumin). This is the stage of microalbuminuria **(Incipient Nephropathy)** which could be reversible with good glycemic control. However, with persistent microalbuminuria, further leakage of

protein in urine will result in overt diabetic nephropathy[8]. This is the stage of microalbuminuria (Incipient Nephropathy) which could be reversible with good glycemic control. However, with persistent microalbuminuria, further leakage of protein in urine will result in overt diabetic nephropathy.Increased level of microalbuminuria is associated with increased risk of progressive kidney disease leading towards end stage renal disease [9.]

Urine albumin-creatinine ratio(UACR) is a ratio between two measured substances. Both the urine albumn (mg/dl) and the urine creatinine (g/dl) are measured values. UACR estimates 24-hour urine albumin excretion. UACR is reported in mg/g and approximates the albumin excretion in mg/day. Unlike a dipstick test for albumin, UACR is unaffected by variations in urine concentration[10]. The UACR is measured using the first morning urine sample when possible. Microalbuminuria is defined as UACR ≥3.5 mg/mmol (female) or ≥2.5 mg/mmol (male), or, with both substances measured by mass, as a UACR between 30 and 300 μg albumin/mg creatinine. An alternative definition of microalbuminuria is a UACR on a random urine sample of more than 30 mg (but less than 300 mg) of albumin per gram of creatinine. Proteinuria is defined as: UACR >30mg/mmol or albumin concentration >200mg/l[10 , 11].

II. Materials And Methods

The present study was conducted in the Department of Biochemistry, with the patients attending the Department of Medicine, Department of Cardiology, Department of Surgery, Department of Ophthalmology, Department of ENT of Silchar Medical College & Hospital,Silchar.

PERIOD OF WORK: July, 2013 to July, 2014

TYPE OF STUDY : CROSS SECTIONAL STUDY

PLAN OF STUDY: This study included 100 persons who were diagnosed to have diabetes mellitus and have no other concomitant diseases. The subjects were divided into 2 groups on the basis of socioeconomic status The possession of BPL cards is considered as the objective criteria to determine the economic status for the study as other criteria would have carried subjective biases.

SELECTION OF STUDY GROUP:

Cases consisted of 100 patients who were diagnosed with Diabetes Mellitus(Type 1 and 2) and who were admitted and who came to visit OPDs of Department of Medicine, Cardiology , Surgery, Ophthalmology, ENT of Silchar Medical College & Hospital, Silchar. The individuals were selected irrespective of age and sex and of different socio-economic status. This group comprised of 100 individuals.They were divided in two groups BPL and NON-BPL on the basis of possession of BPL card.

LABORATORY TESTS DONE:

1. Fasting Blood Glucose Levels
2. Urine Microalbumin levels
3. Urinary Creatinine levels

Fasting blood glucose estimation was done using Hexokinase method(Beckman-Coulter AU systems). Microalbumin was estimated by Immunoturbidimetric Assay method (Beckman-Coulter AU Systems). Urinary Creatinine levels were estinated by Kinetic colour test (Jaffé method) on Beckman Coulter AU analysers. All statistical analysis was done by using graph pad stat statistical software

III. Results And Observation

THE DISTRIBUTION OF SUBJECTS ON THE BASIS OF BPL STATUS

It was found that 43 of patients were BPL card holders. The possession of BPL cards is considered as the objective criteria to determine the economic status for the study as other criteria would have carried subjective biases.

	BPL		NON-BPL	
	NO OF SUBJECTS	%	NO OF SUBJECTS	%
CASES	43	43%	57	57%

TABLE 1 : ECONOMIC STATUS WISE DISTRIBUTION OF THE STUDIED GROUPS

THE DISTRIBUTION OF SUBJECTS ON THE BASIS OF LITERACY

Of the total number of subjects studied 67% were literates 33% were illiterates

	LITERATE		ILLITERATE	
	NO OF SUBJECTS	%	NO OF SUBJECTS	%
CASES	67	67%	33	33%

TABLE 2: LITERACY WISE DISTRIBUTION OF THE STUDIED GROUPS

LITERACY WISE ANALYSIS OF MICROALBUMIN

	MEAN	SD	SEM	95% C I	p VALUE
LITERATES	106.7	106.32	12.98	80.76 – 132.63	<0.05
ILLITERATES	141.99	101.45	17.66	106.01 – 177.96	

TABLE 3: SHOWING LITERACY WISE ANALYSIS OF MICROALBUMIN

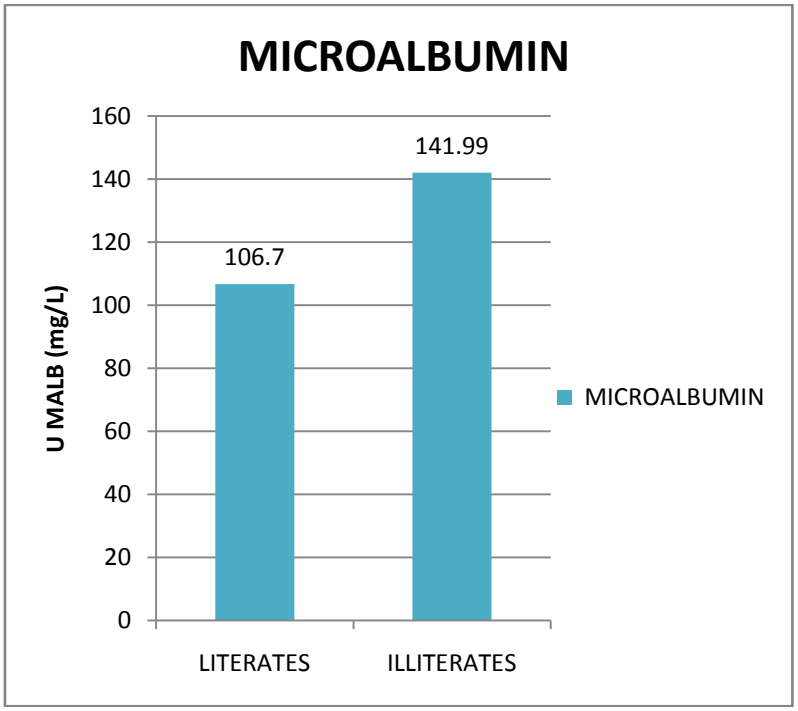

FIGURE 1: SHOWING LITERACY WISE ANALYSIS OF MICROALBUMIN

The mean urinary levels of MICROALBUMIN in literates is found to be 106.7 ± 106.32 and in illiterates is 141.99 ± 101.45. In the Unpaired t- test between literates and illiterates , the two-tailed P value is less than 0.05 (significant).

ECONOMIC STATUS WISE ANALYSIS OF MICROALBUMIN

	MEAN	SD	SEM	95% C I	P VALUE
BPL	142.1	102.13	15.57	110.67 – 173.53	<0.05
NON-BPL	100.43	105.41	13.96	72.46 – 128.40	

TABLE 4 : SHOWING ECONOMIC STATUS WISE ANALYSIS OF MICROALBUMIN

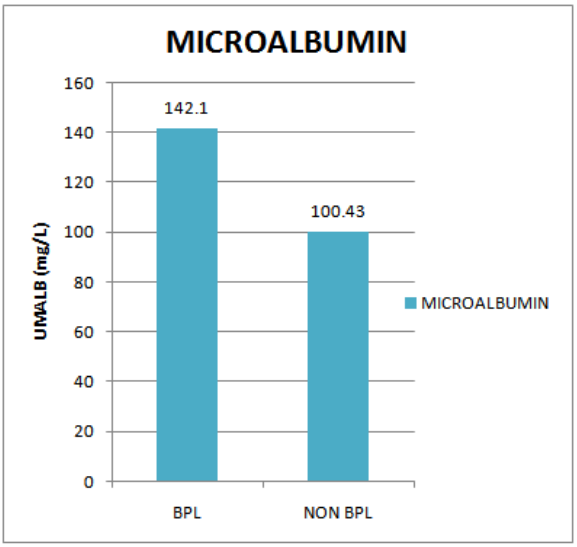

FIGURE 2: SHOWING ECONOMIC STATUS WISE ANALYSIS OF MICROALBUMIN

The mean urinary levels of MICROALBUMIN in BPL is found to be 142.1 ± 102.13 and in NON-BPL is 100.43 ± 105.41. In the Unpaired t- test between BPL and NON-BPL , the two-tailed P value is <0.05 (significant).

ECONOMIC STATUS WISE ANALYSIS OF UACR

	MEAN	SD	SEM	95% C I	Pvalue
BPL	**107.67**	**75.09**	**11.45**	**107.67 – 75.09**	**=0.05**
NON-BPL	**85.08**	**88.53**	**11.72**	**61.59 – 108.57**	

TABLE 5: SHOWING ECONOMIC STATUS WISE ANALYSIS OF URINARY ALBUMIN CREATININE RATIO

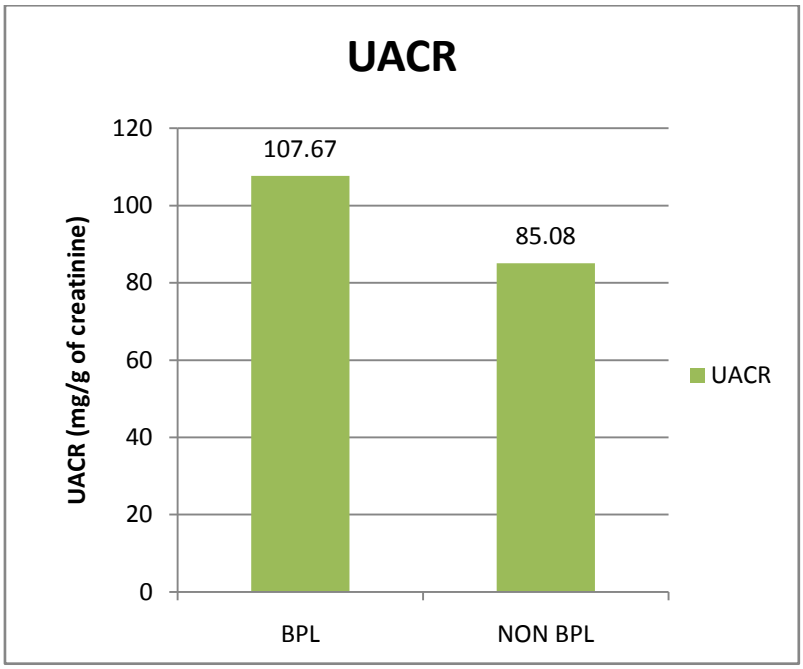

FIGURE 3: SHOWING ECONOMIC STATUS WISE ANALYSIS OF URINARY ALBUMIN CREATININE RATIO

The mean levels Of URINARY ALBUMIN-CREATININE RATIO in BPL is found to be 107.67 ± 75.09 and in NON-BPL is 85.08 ± 88.53. In the Unpaired t- test between BPL AND NON-BPL, the two-tailed P value is equal to 0.05 (significant).

IV. Discussions

The worldwide prevalence of DM has risen dramatically over the past two decades, from an estimated 30 million cases in 1985 to 177 million in 2000. Based on current trends, >360 million individuals will have diabetes by the year 2030[6]. Microalbuminuria (MA) is considered to be a risk factor for diabetic nephropathy (DN) and progressive renal insufficiency in diabetes [12,13.14,15,16].

It was conducted on 100 Diabetic patients came to Silchar Medical College and Hospital, who constituted the Case group. Strict inclusion and exclusion criteria were followed in selecting study groups to avoid confounding factors.

In the present study among the cases the literate groups constituted 67% of cases whereas illiterates constituted 33% of total cases. This may be due to reason that illiterates does not have that health knowledge to come for check up.

It was found that among the cases 57% cases were from non- BPL category and 43% cases were from BPL category , since there is no study confirms the association of diabetes mellitus with the economic status.

LITERACY-WISE: In the present study urinary microalbumin level was compared between the Literates and Illiterates and p value was found equal to 0.05 which is an significant finding and no any other study has been done previously suggesting any significant association. It signifies the importance of education in development of microalbuminuria, illiterates have a high urinary microalbumin level.

ECONOMIC STATUS WISE: In the present study urinary microalbumin level of cases was compared between the BPL and the NON-BPL and p value was found <0.05 which is an significant finding and no any

other study has been done previously suggesting any significant association. It signifies that diabetics from low socioeconomic group are prone to have higher urinary microalbumin level.

ECONOMIC STATUS WISE: In the present study UACR level was compared between the BPL and the NON-BPL cases and p value was found equal to 0.05 which is an significant finding and no any other study has been done previously suggesting any significant association. This finding shows that low socioeconomic status is a risk factor for development of microalbuminuria.

V. Conclusion:

A significant rise was found in urinary microalbumin level among the BPL's as compared to that in NON-BPL's and also among the Illiterates as compared to that in Literates. A significant rise was found in urinary albumin-creatinine ratio among the BPL as compared to that in NON-BPL. Diabetic Nephropathy is a common consequence of long standing diabetes mellitus. Its pathogenesis appears to be complex interactions between genetic and environmental factors. The causal risk factors for microalbuminuria are poor glycemic control, duration of diabetes, illiteracy and poor socio-economic status. Microalbuminuria in diabetes, represents an earlier phase in the development of clinical nephropathy. In estimating diabetic nephropathy risk, AER(Albumin Excretion Rate) is most important and should be done frequently but there are gains to be made in predictive precision by considering literacy, economic condition, duration and glycaemic control of the patient. Improving the glycaemic control can revert the microalbuminuria. Also proper diagnosis and treatment helps in preventing the development of incipient nephropathy.

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