



## FREQUENCY OF ABNORMAL KIDNEY FUNCTION TESTS IN PATIENTS WITH DIABETES MELLITUS TYPE 2

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### ABSTRACT

**BACKGROUND :** In this study, we determined frequency of abnormal kidney function tests in patients with diabetes mellitus type 2 and its glycemic profile.

**METHOD :** This is an prospective study on patients diagnosed with diabetes mellitus type 2 in Geetanjali Medical College and Hospital, Udaipur. 83 cases were included in the study. Kidney function tests along with other blood routine tests were done.

**RESULTS :** The mean creatinine with standard deviation was  $1.453 \pm 1.337$ . The mean uric acid with standard deviation was  $6.06 \pm 1.37$ . The mean RBS with standard deviation was  $240.70 \pm 97.64$ . There was no statistically significant difference among the mean of normal and abnormal KFT patients for Hb, TLC, PC, Na, K, Cl and RBS as their p value was  $>0.05$ . However, there was statistically significant difference among the mean values of normal and abnormal KFT patients as the p value for the following was  $<0.05$ .

**CONCLUSION :** This study concludes that biochemical parameters of kidney functions are associated with a worsening in insulin action and predicts the development of Type 2 diabetes. The study also revealed that in order to prevent the progression of diabetes mellitus to diabetic nephropathy, vigilant monitoring of serum urea and creatinine would help in the early diagnosis of renal failure and could make treatment possible.

### KEYWORDS : Kidney Function Tests, Diabetes Mellitus Type 2

#### BACKGROUND

Diabetes mellitus is a group of clinical syndrome characterized by hyperglycemia due to defects in insulin action, insulin secretion, or both causing diabetes mellitus. The chronic hyperglycemia of diabetes leading to long-term damage, dysfunction and failure of various organs, especially the kidneys, eyes, heart, nerves, and blood vessels. Type 2 diabetes mellitus has quickly become a global health problem due to rapidly increasing population growth, urbanization, aging and increasing prevalence of physical inactivity and obesity. These complications are due to long lasting effects of diabetes mellitus on the glomerular microvasculature of the kidney causing Diabetic nephropathy. Diabetic nephropathy (DN) develops in patients with several years of medical history of diabetes and uncontrolled hyperglycemia. Diabetes is the leading cause of end-stage renal disease (ESRD) in most countries of the world. Type 2 DM showed that intensive blood glucose control early in the course of disease exhibits a long-lasting favorable effect on the risk of Diabetic Kidney disease development. In diabetes, the cells do not receive glucose and most of it is accumulated in the blood causing hyperglycemia. Creatinine, Urea, uric acid, are the parameters to diagnose functioning of the kidney. However, Changes in serum creatinine concentration more reliably reflect changes in Glomerular filtration rate than changes in serum urea concentrations. As Diabetes mellitus is the major cause of renal dysfunction, so a good control over the sugar level can halt the progression of renal damage. Serum BUN has a negative relationship with serum triglycerides in patients with diabetes mellitus, therefore a decrease in serum BUN may increase serum triglycerides. In the other hand, serum creatinine has a positive relationship with serum triglycerides, thus the increase in serum creatinine can also increase serum triglycerides in patients with diabetes mellitus.

#### AIM AND OBJECTIVES :

1. To determine the frequency of abnormal kidney function test in patients with diabetes mellitus type 2.
2. To study the relationship between abnormal kidney function test and glycemic profile.
3. To study the relationship between abnormal kidney

function test and sociodemographic variable in patient with diabetes mellitus type 2.

#### MATERIALS AND METHOD :

This is prospective study which will be conducted on 83 patients of type 2 diabetes mellitus with age  $> 18$  year. It will be collected with meticulous detailed history and thorough physical examination as indicated for a particular case will be done along with appropriate investigations. Relevant blood investigation will be performed and Kidney function test will be performed for each patient. Other investigation as needed for a patient will also be performed. Each patient in the study group will be followed till discharge. The following parameters will be looked in: a. Blood investigations cbc, Rbs, HbA1c, Urine complete examination, Abnormal kidney function test which include S.creatinine, B.urea, S.uric acid, S.Electrolytes, BUN, Estimated glomerular filtration rate (e GFR) by Cockcroft gault formula.

#### INCLUSION CRITERIA :

All patient of diabetes mellitus type 2 on treatment either insulin or hypoglycaemic drugs, Newly diagnosed diabetes mellitus, Patient aged more than 18 year of age, Patient admitted in ward and Patient or relatives who sign an informed consent.

#### EXCLUSION CRITERIA :

Gestational diabetes mellitus patients, Drug induce diabetes mellitus patient and patients admitted in ICU.

#### RESULTS :

With 83 no of cases, the mean age with standard deviation was  $56.45 \pm 13.397$  years. The mean and standard deviation Hb for all patients  $12.4804 \pm 2.03323$ . The mean creatinine with standard deviation was  $1.453 \pm 1.337$ , the mean urea with standard deviation was  $57.54 \pm 42.14$ , the mean uric acid with standard deviation was  $6.06 \pm 1.377$ , the mean BUN with standard deviation was  $26.909 \pm 19.705$ , the mean EGFR with standard deviation was  $71.912 \pm 41.16$ , the mean HbA1C with standard deviation was  $10.211 \pm 2.72$  and the mean RBS with standard deviation was  $240.70 \pm 97.64$ . There was no statistically significant difference among the mean of normal

and abnormal KFT patients for Hb, TLC, PC, Na, k, Cl and RBS as their p value was >0.05. However, there was statistically significant difference among the mean values of normal and abnormal KFT patients as the p value for the following was <0.05 . Out of 51 patients with normal KFT, 19 were male and the remaining 32 were female. Furthermore, out of 32 patients with abnormal KFT, 14 were female and 18 were male. There was no statistically significant difference between gender of the normal and the abnormal KFT patients p value was >0.05 Out of 51 patients with normal KFT, majority of them belonged to 61-70 years of age group. Furthermore, out of 32 patients with abnormal KFT majority of them belonged to 51-60 years of age group. There was no statistically significant difference between age group of the normal and the abnormal KFT patients p value was >0.05.

	KFT	N	Mean	Std. Deviation	P-value
Hb	Normal	51	12.8033	1.96285	>0.05
	Abnormal	32	11.9656	2.06782	
TLC	Normal	51	9.0033	2.74426	>0.05
	Abnormal	32	9.5063	2.76766	
PC	Normal	51	2.1025	.73371	>0.05
	Abnormal	32	1.9584	.62853	
Create	Normal	51	0.8927	0.19134	<0.05
	Abnormal	32	2.3466	1.82522	
Urea	Normal	51	36.4853	15.11315	<0.05
	Abnormal	32	91.0994	49.38233	
U. Acid	Normal	51	5.8224	1.01920	<0.05
	Abnormal	32	6.4469	1.76031	
Na	Normal	51	136.84	6.754	>0.05
	Abnormal	32	134.94	7.080	
K	Normal	51	5.1216	5.44949	>0.05
	Abnormal	32	6.0625	7.66848	
Cl	Normal	51	99.494	5.8100	>0.05
	Abnormal	32	101.469	11.0512	
BUN	Normal	51	17.0561	7.06063	<0.05
	Abnormal	32	42.6141	23.07431	
EGFR	Normal	51	81.3441	31.64191	<0.05
	Abnormal	32	56.8816	49.87343	
RBS	Normal	51	229.351	93.5787	>0.05
	Abnormal	32	258.800	102.6894	

		KFT		Total	P-value	
		Normal	Abnormal			
Sex	Female	Count	19	14	33	>0.05
		% within KFT	37.3%	43.8%	39.8%	
	Male	Count	32	18	50	
		% within KFT	62.7%	56.3%	60.2%	
Total		Count	51	32	83	
		% within KFT	100.0%	100.0%	100.0%	

	KFT	N	Mean	Std. Deviation	P-value
HbA1C	Normal	51	9.6639	2.25479	<0.05
	Abnormal	32	11.0844	3.19325	

		KFT		Total	P-value	
		Normal	Abnormal			
Age Group (Years)	31-41	Count	8	4	12	>0.05
		% within KFT	15.7%	12.5%	14.5%	
	41-50	Count	11	8	19	
		% within KFT	21.6%	25.0%	22.9%	
	51-60	Count	9	10	19	
		% within KFT	17.6%	31.3%	22.9%	
	61-70	Count	18	6	24	

	% within KFT	35.3%	18.8%	28.9%	
71-80	Count	2	3	5	
	% within KFT	3.9%	9.4%	6.0%	
>80	Count	3	1	4	
	% within KFT	5.9%	3.1%	4.8%	
Total	Count	51	32	83	
	% within KFT	100.0%	100.0%	100.0%	

**DISCUSSION :**

In the current study the number of males was 50 and the number of females was 33. This implied that the study showed male predominance. Similarly according to the study of Caramori et al, (2013) and Al Salhen, (2016) also showed that the number of males was greater than that of the females depicting that males were more affected as compared to females. In the current study the mean age with standard deviation was 56.45±13.397 years. It was identified that the current mean age was higher than that of the study conducted by Caramori et al, (2013) where it was 35.0±9.9 years. However, the current mean age was at par with that of Al Salhen, (2016) where the mean age was 56.10±7.82 years. In the current study it was identified that majority of the diabetic patients had the disease from 0-5 years. Similar results were found in the study of Al Salhen, (2016) where the majority of the diabetic patients had the disease for <5 years. Furthermore, in the current study the mean create with standard deviation was 1.453±1.337, the mean urea with standard deviation was 57.54±42.14 and the mean uric acid with standard deviation was 6.06±1.377. Therefore, it was identified that there was a statistically significant correlation among these factors and diabetes. Similar results were found in the study of Bamanikar et al, (2016)13 where a strong positive correlation between the serum urea levels and blood sugar levels. However, the study contrasted the current findings as it was found in the study that there was a weak positive correlation between serum creatinine levels and blood sugar.

**CONCLUSION :**

It has been identified in the current study that biochemical parameters of kidney functions are associated with a worsening in insulin action and predicts the development of Type 2 diabetes. The study also revealed that in order to prevent the progression of diabetes mellitus to diabetic nephropathy, vigilant monitoring of serum urea and creatinine would help in the early diagnosis of renal failure and could make treatment possible.

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