

# The Relationship between Diabetes Mellitus and Renal Failure in Babylon Province

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## Abstract

This study was done at medical merjan city that included 70 blood samples have been collected from chronic renal failure patients and compared with 30 samples from apparent healthy individuals as control group, Which were collected between November, 2015 and January, 2016. The samples of patients comprised of 42 male and 28 female at the ages range from( 24-84) years while the control group included 15 female and 15 male those aged( 23-81)years. This study estimated the level of blood Urea, serum Creatinine, and fasting blood Glucose in patients who had the renal problem in diabetes case. There were high significant correlation between S. Ur and S. Cr, and non significant correlation between B. Ur and S. Glu.

## Aim of the study

1-Estimating the level of blood urea ,serum creatinine and fasting serum glucose in patients have chronic renal failure and diabetes mellitus compared with the same parameters in normal healthy controls and study the correlation between diabetes mellitus and renal failure .

**Keywords:** Renal Failure, diabetes mellitus, urea ,serum creatinine, serum glucose

## INTRODUCTION

Diabetes is a state in which a person has a high blood sugar (glucose) level, either because the body doesn't produce enough insulin or because body cell don't properly respond to the insulin that is produced <sup>(1)</sup>

There are two major types of diabetes, firstly, Type 1 diabetes which can occur at any age, but it is frequently diagnosed in children, teen ,or young adults in this disease ,the body makes little or no insulin so, daily injections of insulin are needed .the exact cause is unknown <sup>(2)</sup> , the majority of type 1diabetes of the immune –mediated nature, Secondly, Type 2 diabetes, which makes up most diabetes cases .it most often occurs in adulthood . however, because of high obesity rate, teens and young adults are now being diagnosed with it. many people with type 2 diabetes do not know they have it. <sup>(3)</sup>

In the renal failure or kidney failure the kidney fail to function adequately and may be due to a large number of other medical problems. In renal failure is described as

decrease in glomerular filtration rate. <sup>(9)</sup>

the classification of renal failure is divided into acute renal failure(ARF) and chronic renal failure(CRF) ,all types of renal failure is determined by trend the serum creatinine, presence of anemia and the kidney size on ultra sound. In chronic disease generally lead to anemia and small kidney size. <sup>(10)</sup>

## MATERIAL AND METHODS

### Patients

Subjects for this study were 70 patients (42 male and 28femal) with different age suffering from both diabetes mellitus and renal failure, attending the medical marjane city the stady has been performed within few months. with the 30 control group.

### Blood samples

Five ml of venous blood sample were collected from the patients serum will separated by centrifugation.

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### Methods:

Three tests were done for the patients blood samples included fasting serum glucose, blood urea and serum creatinine where Ur kit, Cr. Kit, Glu. Kit are used by spectroscopic method where UV-9200 spectrophotometer are used for these tests.

### Procedures

#### 1-Urea Estimation:

##### A-Principle

##### B- Normal value

Serum or plasma

	mmol/l	g/l	mg/dl
infants	1.00-3.00	0.06-0.18	6-18
children	2.50-5.50	0.15-0.33	15-33
adults	2.50-7.50	0.15-0.45	15-45

#### 2-Creatinine Estimation

##### A-Principle

Creatinine in a basic picrate solution which forms a colored complex. The absorbance at predetermined times

##### B-Expected values

Serum or plasma

creatinine	μmol/l	mg/dl
Male	80-115	0.9 to1.3
Female	53-97	0.6 to 1.1

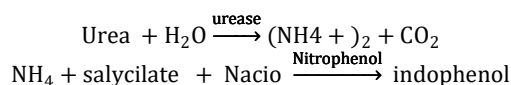
#### 3-Glucose Estimation:

##### A- principle

The glucose is oxidized to D-glucose by the glucose oxidase(GOD) with the formation of hydrogen peroxide in the presence of peroxidase (POD)

a mixture of phenol and 4-aminoantipyrine(4-AA) is

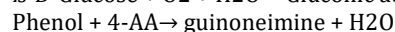
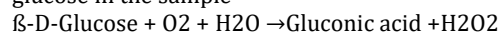
Urea is hydrolyzed by urease into Ammonia and Carbon dioxide. the ammonia generated reacts with alkaline hypochlorite and sodium salicylate in the presence of sodium nitroprusside as coupling agent to yield green chromophore. The intensity of the color formed is proportional to the concentration of urea in the sample.<sup>(26)</sup>



during conversion in proportional to the concentration of creatinine in the sample.<sup>(27)</sup>

The following reagents were pipetted in test tubes.

oxidized by hydrogen peroxidase to form a red guinoneimine dye proportional to the concentration of glucose in the sample<sup>(28,29)</sup>.



##### B-Reference values

Serum or plasma	65-110 mg/dl
	3.61-5.55 mmol/l

## RESULTS

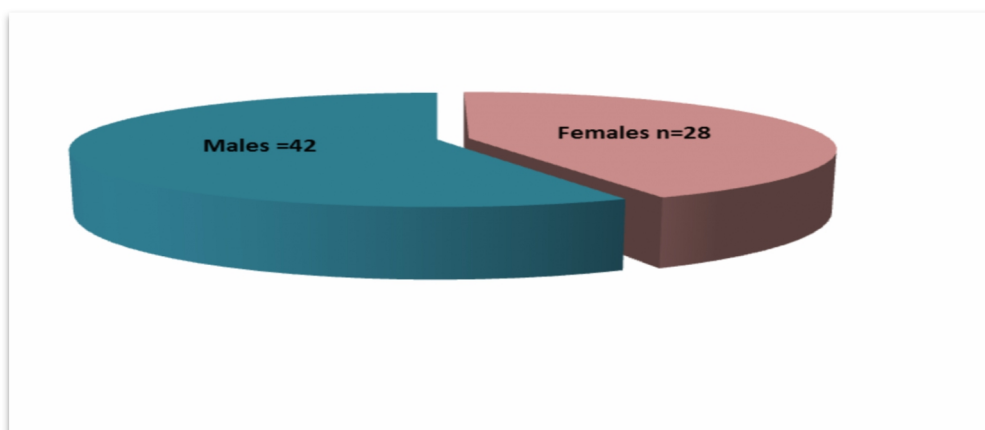


Figure 1. The number of patients groups according to gender.

Control



**Figure 2.** The number of control groups according to gender.

**Table 1.** The mean and standard deviation of ages [year] in patients group and control groups.

Studied groups	N	Mean±SD	P-value
Patients group	70	50.35± 14.476	N. S
control group	30	42.80± 14.378	

This table shows the ages of the patients and control group. we show that non Significant between them

**Table 2.** Mean distribution of fasting serum glucose[mmol/l] in patients group and control group.

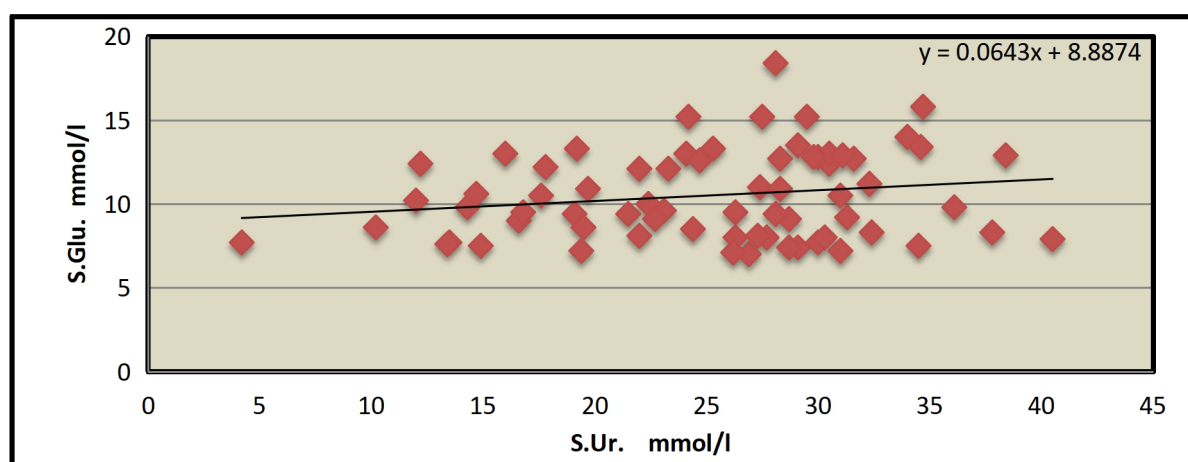
Studied groups	N	Mean±SD	P-value
Patients group	70	10.49± 2.587	< 0.001
control group	30	4.83± .834	

This table shows the highly significant between the patient and control group (p ~ 0.001)

**Table 3.** Mean distribution of serum urea[mmol//l] in patients group and control groups.

Studied groups	N	Mean±SD	P-value
Patients group	70	25.13± 7.426	< 0.001
control group	30	31.03± 6.66	

This table shows the highly significant between the patients and control group (p~0.001)

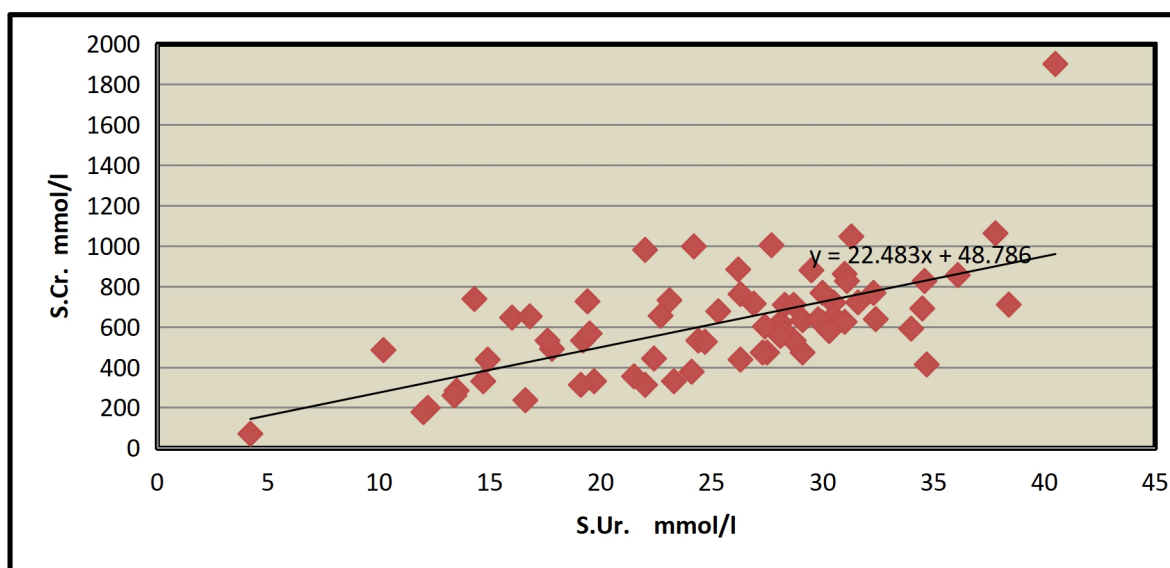


**Figure 3.** Correlation between fasting serum glucose [mmol//l] and serum urea [mmol//l] in patients groups.

**Table 4.** Mean distribution of serum creatinine [mmol/l] in patients group and control groups.

Studied groups	N	Mean±SD	P-value
Patients group	70	63.00± 267.256	< 0.001
control group	30	63.00± 2.117	

This table shows the highly significant between the patient and control group (p~0.001).



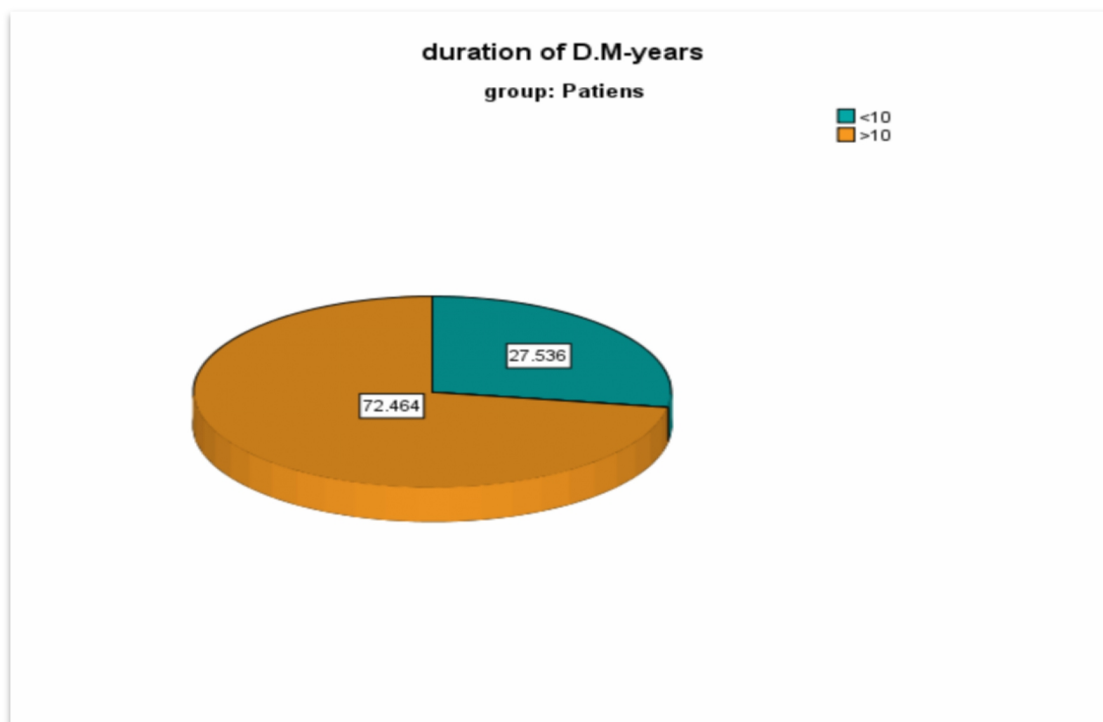
**Figure 4.** Correlation between serum urea [mmol/l] and serum creatinine [mmol/l] in patients groups.

**Table 5.** duration of diabetes mellitus (years) in patients group.

Duration (year)	Frequency	Percent
Valid <10	19	27.5

	>10	51	72.5
	<b>Total</b>	70	100.0

**Figure 5.** Correlation between studied parameters in patients group.



		S.Ur. mmol/l	S.Cr. mmol/l	S.Glu. mmol/l
S.Ur. mmol/l	<b>Pearson Correlation</b>	1	.623**	.173
	<b>Sig. (2-tailed)</b>		.000	.154
	<b>No.</b>	70	70	70
S.Cr. mmol/l	<b>Pearson Correlation</b>	.623**	1	-.059
	<b>Sig. (2-tailed)</b>	.000		.629
	<b>No.</b>	70	70	70
S.Glu. mmol/l	<b>Pearson Correlation</b>	.173	-.059-	1
	<b>Sig. (2-tailed)</b>	.154	.629	
	<b>No.</b>	70	70	70

There were no significant correlation between S.Glu with urea and creatinine and there was a significant positive correlation between urea and creatinine.

## DISCUSSION

Diabetes is the most common cause of kidney failure, Even when diabetes is controlled, since, from this study we can see that the DM can lead to chronic kidney disease (CKD) and kidney failure. The minimum age of the patient in our study was 19 years and the maximum age was 84 years. And 12-81 years in the control group. we show that no Significant between them. **duration** of diabetes mellitus <10 years in 19 patients and >10 in 51 patient. There were high significant correlation between S. Urea and S. Cr, and non significant correlation between S. urea and S. Glu.

## CONCLUSION

Diabetic nephropathy, especially related to type 2 diabetes, has become the single most important cause of end-stage renal disease (ESRD). Management of traditional risk factors such as hypertension, hyperlipidemia, and smoking to improve renal outcomes continues to be important in patients with chronic kidney disease. There is, however, growing recognition that nontraditional risk factors such as increased S. urea,

elevated serum creatinine levels, may also be important in individuals with chronic kidney disease. The importance of the identification of levels of S. urea as well as serum creatinine to predict the development of ESRD in patients with type 2 diabetes and nephropathy.