

Study the Associations between Age and Levels of Glucose, Renal Function Tests in Type 2 Diabetic Patients.

Batool Ibrahim Hussain¹

1 College of nursing, University of Babylon, nur.batool.ibrahim@uobabylon.edu.iq

* email: nur.batool.ibrahim@uobabylon.edu.iq

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Abstract

Background:

Diabetic patients commonly suffer from some diabetic renal function disorder. Estimation urea and creatinine in the serum are considered as a good clinical indicators to assess glomerular filtration rate and renal function. This study aimed to study the relation between the levels of serum glucose, urea and creatinine with type 2 diabetic patients and their ages.

Materials and Methods:

The blood samples obtained from the participants when they attended AL-Hashymia Hospital, Babylon, Iraq. About 50 patients who are subdivided according to the age into 4 groups are: 20-29, 30-39, 40-49 and ≥ 50 years old. Control group also included 50 healthy subjects and subdivided into the same above age groups.

Results:

The results show that there is a positive significant ($P = 0.029$, $r = 0.308$) and highly significant ($P=0.001$, $r=0.728$) correlation between each of the serum glucose level, serum urea level and the age of diabetic patients respectively, but there is no significant correlation between level of serum creatinine and the age of diabetic patients as well as between all studied parameters related to control subjects and their age.

Conclusion:

In diabetic patients the levels of serum glucose and serum urea increase with the progression of age which may result more complications in diabetic patients, so it is necessary to give a super follow up to older diabetic patients.

Key words:

diabetic disease, renal function test, urea, creatinine

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INTRODUCTION

Diabetic disease is a common metabolically disorders which described by its complexity that result from the role of high levels of glucose in producing a metabolic mitochondrial dysfunction and free radicals over production [1].

Diabetic renal disease is a main diabetes mellitus complication and most of diabetic patients had diabetic renal disease [2] and glomerular filtration rate can be examined through checking serum urea and creatinine [3].

Previous studies investigated the relation between glucose and each of urea and creatinine, as well as compared all these parameters between males and females [4] and [3]. So this study aimed to investigate if there is any relation between these parameters and age of diabetic patients type 2 and is it necessary to give elderly diabetic patients a vigorous follow-

up to control their blood glucose levels and prevent further complications resulting from diabetes .

Materials and Methods:

*Subjects

The participants in this study are the type 2 diabetic patients, blood samples were obtained when these patients were attended AL-Hashymia Hospital, Babylon, Iraq. About 50 patients who are subdivided according to the age into 4 groups are: 20-29 , 30-39, 40-49 and ≥ 50 years old. Control group also included 50 healthy subjects and subdivided into the same above age groups.

blood samples were drawn after a fast of 8 hours or more. All studied parameters in this research were estimated accordance the procedures that described by previous published reports as follow: procedure of serum glucose described by Pagana& Pagana [5] , procedure of serum creatinine described by Henry [6] and finally serum urea estimated accordance to a procedure described by Patton and Croush [7].

Statistical Analysis:

SPSS-ver.20 was used .A descriptive analysis to describe the study variables: frequencies and percentages; and inferential statistic is used by applying the r: Pearson correlation as well as T test has been used [8].

Results and Discussion

The results show that there are a significant variances in all calculated Parameters between Patients and Control as shown in Table 1.

Table 1: Studied parameters in control and patients groups.

Variables	Control	Patients	C.S. (*) P-value
	(M \pm SD) N=50	(M \pm SD) N=50	
Glucose(mmol/l)	4.82 \pm 0.694	14.18 \pm 1.443	0.025 Sig.
Urea (mmol/l)	4.35 \pm 0.985	6.65 \pm 3.885	0.046 Sig.
Creatinine (μ mol/l)	70.12 \pm 16.513	87.69 \pm 31.474	0.010 Sig.

Each group of patients and control was subdivided separately into 4 age groups and they were distributed according to these age groups representing as the percentages, as shown in figure 1.

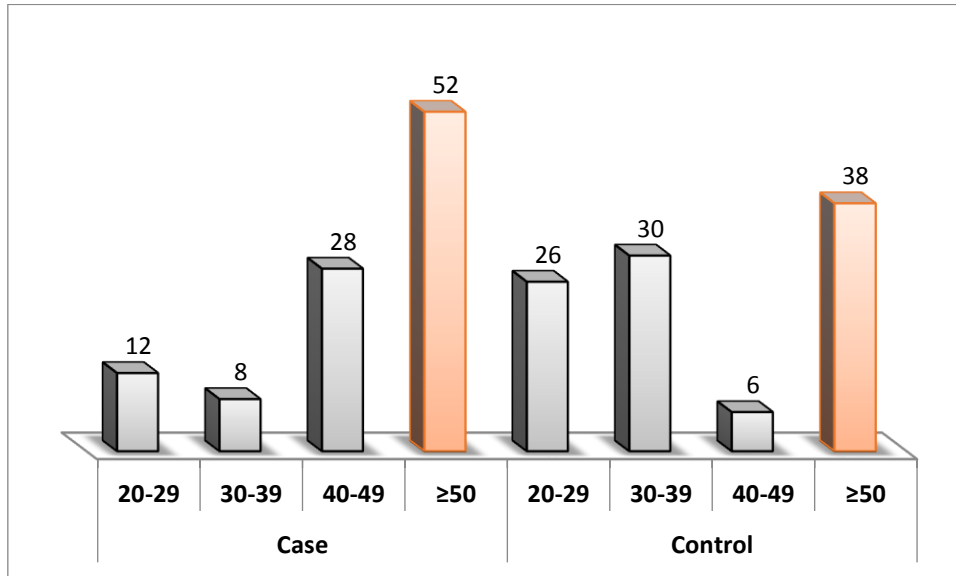


figure1: distribution of study sample According to age

Figure2 illustrates a percentage of males and females in each group patients and control separately.

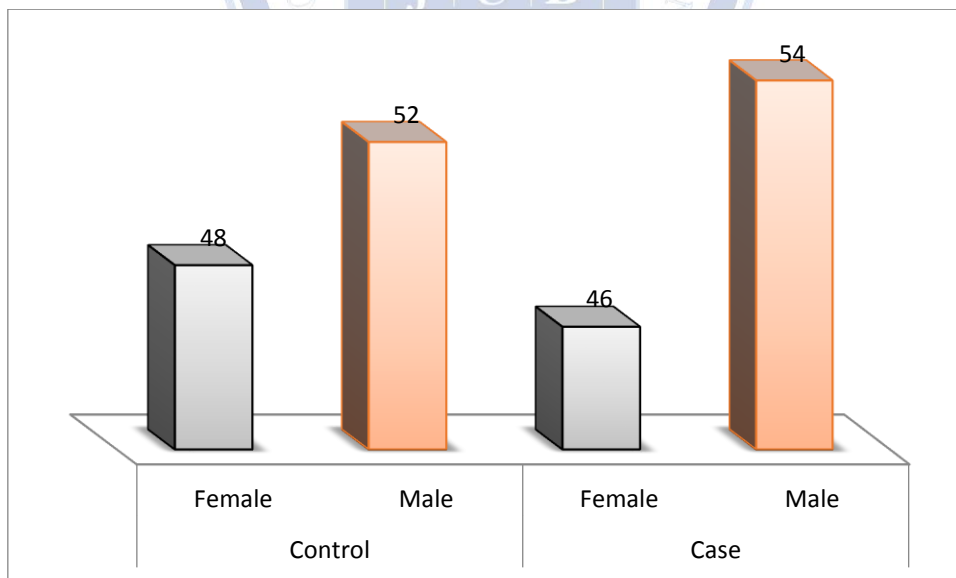


Figure 2: Distribution of Study Sample according to Gender

The bivariate correlation analysis illustrates all the correlations in this study, and show That There is a positive significant relationship between the serum glucose level and patients age at p-value= 0.029 , table 2.

Table2: correlation Between Serum glucose level and age of Diabetic Patients (N=50).

Patients Age(yearsold)	Glucose Level		
	Normal	Abnormal	Total
20 - 29	1	5	6
30 - 39	0	4	4
40 - 49	0	14	14
≥ 50	0	26	26
Total	1	49	50
r = 0.308			p-value= 0.029
			Sig.= S

r: Pearson correlation, p: Probability, Sig: Significance.

Table 3 reveal that there is a positively highly significant relationship between serum urea and the patients age at p-value= 0.001 , while there is not any significant relationship between Serum Creatinine and the age of diabetic patients at P-value= 0.498 , as shown in Table 4.

Table 3: Correlation between Serum Urea level and age of Diabetic Patients (N=50).

Patients Age(yearsold)	Urea Level		
	Normal	Abnormal	Total
20-29	6	0	6
30-39	0	4	4
40-49	2	12	14
≥ 50	0	26	26
Total	8	42	50
r = 0.728			p-value= 0.001
			Sig.= HS

r: Pearson correlation, p: Probability, HS Sig: Highly Significance.

Table4: Correlation between Serum Creatinine level and age of Diabetic Patients (N=50).

Patients Age (yearsold)	Creatinine Level		
	Normal	Abnormal	Total
20-29	4	2	6
30-39	2	2	4
40-49	14	0	14
≥ 50	20	6	26
Total	40	10	50
r = - 0.098			p-value= 0.498
			Sig.= NS

r: Pearson correlation, p: Probability, NS: No Significant

When the statistical analysis had done on control group to investigate if there is any correlation between the parameters of this study and the age of normal subjects. The result revealed that there is not any significant relationship among the Serum Level of glucose, urea and creatinine related to normal participant subjects with their age, $p\text{-value} > 0.05$, as shown in Table 5.

Table5: Correlation between Serum levels of Glucose, Urea, Creatinine and age of Control (N=50).

		Age	Glucose	Urea	Creatinine
Age	pearson correlation	1	.233	-.014-	.167
	sig. (2 - Tailed)		.103	.921	.248
	N	50	50	50	50
Glucose	pearson correlation	.233	1	.123	-.040-
	sig. (2 - Tailed)	.103		.396	.785
	N	50	50	50	50
Urea	pearson correlation	-.014-	.123	1	-.042-
	sig. (2 - Tailed)	.921	.396		.771
	N	50	50	50	50
Creatinine	pearson correlation	.167	-.040-	-.042-	1
	sig. (2 - Tailed)	.248	.785	.771	
	N	50	50	50	50

The results of this study illustrate that there is a significant difference between serum level of glucose, urea and creatinine with patients and control group, this result refers to hyperglycemia role in affecting renal function. This study revealed that there is no significant correlation between each of the serum level of glucose, urea and creatinine with the age of normal subjects in control group, while there is a positive significant ($P = 0.029$, $r = 0.308$) and highly significant ($P=0.001$, $r=0.728$) correlation between each of the serum glucose, serum urea and the age of diabetic patients respectively. This Result is Agree with Nanayakkara et al [9]. Who stated that the complication of vascular disease was increased in older diabetic patients and another study reported that there was a strong correlation between glucose and urea [3]. So with age progression, serum glucose and urea will increase this result may be due to the effect of ageing and interplaying between genetic alteration, life style factors and ecological factors in causing more renal function disorder in diabetic patients.

The result of this study revealed that there is no significant correlation between level of serum creatinine and the age related to diabetic patients, this result can be due to a weak correlation between creatinine and blood glucose [3]. so with progress of age, serum glucose increased but serum creatinine level do not affected significantly.

Conclusion:

In diabetic patients and with the progression of patients age , some renal function will be affected adversely by the high level of serum glucose so hyperglycemia must be controlled to prevent increasing the renal function disorder in type 2 diabetic patients.

Acknowledgment:

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Conflict of interests.

There are non-conflicts of interest.

References:

- [1] Nishikawa, T.; Edelstein, D.; Du, X.L.; Yamagishi, S.-I.; Matsumura, T.; Kaneda, Y.; Yorek, M.A.; Beebe, D.J.; Oates, P.J.; Hammes, H.-P.; *et al.* . Normalizing mitochondrial superoxide production blocks three pathways of hyperglycaemic damage. *Nat. Cell Biol.*, 404, 787–790, 2000.
- [2] Farah, R.I. ; Al-Sabbagh, M.Q.; Momani, M. S.; Albtoosh1 , A.; *et al.* . Diabetic kidney disease in patients with type 2 diabetes mellitus: a cross-sectional study. *BMC Nephrology* ; 22:223, 2021.
- [3] Bamanika, S.A.; Bamanika, A.A.; &Arora, A . Study of serum urea and creatinine in diabetic and nondiabetic patients in Tertiary Teaching Hospital. *The Journal of Medical Research*; 2 (1): 12-15, 2016.
- [4] Salih, D.H. . Study of Liver Function Tests and Renal Function Tests in diabetic type II patients. *IOSR Journal of Applied Chemistry*; Volume 3, Issue 3 : PP 42-44, 2013.
- [5] Pagana, K.D.& Pagana, T.J. .*Mosby's Manual of Diagnostic and Laboratory Tests*. 3rd ed. 8, 2006.
- [6] Henary, R.J. *Clinical chemistry , Principles and techniques* , second edition Harper and Row , 1974.
- [7] Patton ,C.J. and Crouch, S.R. .Spectrophotometric and kinetics investigation of Bethelot reaction for the determination of ammonia In. :*Anal Chem.*;49 :464-9, 1977.
- [8] Black, T.R.. *Correlational studies. Understanding Social Science Research* (2 nd ed., pp: 159-178). Thousand Oaks, CA: Sage.
- [9] Nanayakkara , N.; Curtis, A.J.; Heritier, S.; *et al.*. Impact of age at type 2 diabetes mellitus diagnosis on mortality and vascular complications: systematic review and meta-analyses. *Diabetologia* ; 64:275–287, 2021.

الخلاصة

مقدمة:

يعاني مرضى السكري عادة من بعض اضطرابات وظائف الكلى السكري. يعد قياس اليوريا والكرياتينين في مصل الدم من المؤشرات السريرية الجيدة لتقييم معدل الترشيح الكبيبي والوظيفة الكلوية. هدفت هذه الدراسة إلى دراسة العلاقة بين مستويات الكلوكرز واليوريا والكرياتينين في الدم لدى مرضى السكري من النوع الثاني وأعمارهم.

طرق العمل:

عينات الدم تم الحصول عليها من المشاركين أثناء زيارتهم لمستشفى الهاشمية ، بابل ، العراق. حوالي 50 مريضاً تم تقسيمهم وفقاً للأعمار إلى 4 مجموعات هي: 20-29 ، 30-39 ، 40-49 و 50 عاماً وأكثر. تضمنت مجموعة السيطرة أيضاً 50 من الأشخاص الأصحاء وتم تقسيمهم إلى نفس الفئات العمرية المذكورة أعلاه.

النتائج:

أظهرت النتائج أن هناك علاقة ارتباط موجبة معنوية ($P = 0.029$, $r = 0.308$) وعالية المعنوية ($P=0.001$, $r=0.728$) بين كل من مستوى الكلوكرز و مستوى اليوريا في الدم وعمر مرضى السكري على التوالي ، ولكن لا توجد علاقة ارتباط معنوية بين مستوى الكرياتينين في الدم وعمر مرضى السكري وكذلك بين جميع المتغيرات المدروسة المتعلقة بمجموعة السيطرة وأعمارهم.

استنتاج:

تزداد مستويات الكلوكرز واليوريا في الدم مع تقدم العمر لمرضى السكري مما يؤدي إلى المزيد من المضاعفات لدى هؤلاء المرضى ، لذلك من الضروري إجراء متابعة فائقة لمرضى السكري ذوي الأعمار المتقدمة.

الكلمات المفتاحية:

مرض السكري ، اختبار وظائف الكلى ، اليوريا ، الكرياتينين.

