# A comparative study assess the relation between serum creatinine and urea with glycemic index among patients with Type 1 and Type 2 diabetes mellitus

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## Introduction

Diabetes is a growing problem in India, and it could become a public health crisis. The number of people who will die, be seriously injured, or become permanently disabled because of diabetes and its complications is impossible to overestimate. Multiple organ failures, such as those of the eyes, kidneys, nerves, heart, and vascular system are linked to diabetes-related chronic hyperglycemia in people with the diabetes type 2. Diabetic nephropathy (also known as diabetic kidney disease) and end-stage renal disease (ESRD) are the most common causes of kidney failure in people with diabetes. Patients with diabetes are expected to suffer from diabetic nephropathy, which affects between 25 and 45 percent of diabetics. Nephropathy in people with Type 1 diabetes usually manifests its full severity between the ages of 10 and 15 years after the disease has first manifested itself. Only about one percent of patients without proteinuria develop overt renal disease after twenty-five years. Glycosylation of tissue proteins may play a role in diabetic nephropathy, in addition to other microvascular complications.

The free amino acids in circulating or tissue proteins are combined with the extra glucose in diabetes mellitus hyperglycemia. Through an Amadori rearrangement, non-enzymatic glycosylation produces both early and advanced products that are not reversible (AGEs). An increase in renal and microvascular problems due to collagen cross-linking with AGEs has been documented. The incidence of diabetic nephropathy can be reduced by ensuring that your blood sugar is in the normal range.

The first signs of nephropathy are a decrease in glomerular filtration rate (GFR) and an increase in serum creatinine concentrations.

Serum creatinine and creatinine concentrations in diabetic subjects were examined as part of this study, which also sought to determine if there was a correlation between these levels and the length of time that a diabetic subject had been diagnosed or how much glycosylated haemoglobin they had in their blood (HbA1c)

## Methodology

The Institutional Ethical Review Committee at a tertiary hospital in Indore approved this study, which was then carried out.The only participants in this study were men aged 45 to 55. One hundred patients with Type 1 and Type 2 diabetes, and another hundred healthy volunteers from the general population were divided into two groups. Before a thorough medical, personal history, and systems examination, written consent was obtained.Study participants who had a history of kidney disease were not permitted to take part.The following were the anthropometric measurements:The closest year to the date of birth was used to calculate each person's age and height (ii) (less than six months and more than six months). To get an accurate centimetre reading, we used a height measurement stadiometer.using a portable human weighing machine, (iv) the BMI, or body mass index: kg/m2, was calculated. Measure your height and weight in metres squared (m2) and kilogrammes (kg) (m2).

To estimate the biochemical parameters, the clinical biochemistry laboratory utilised commercial kits modified for auto analyzers. Fasting and post-meal plasma glucose levels were measured in all diabetic patients using ethylenediamine tetraacetic acid bulbs. The serum glucose levels were estimated using the glucose oxidase and peroxidase method. Blood was spun at 3000 rpm for ten minutes to separate the serum from the red blood cells.

To determine serum urea levels, Berthelot's method was used, while Jaffe Picrate's alkaline method was used. These biochemical parameters were measured using a clinical chemistry analyzer. Creatinine-normal urea levels ranged from 10 to 45 mg/dL. To estimate HbA1c, the ion exchange resin method was used, and Asritha Diatech diagnostic HbA1c kits were used in accordance with the provided guidelines.The mean and standard deviation (SD) of the data were calculated. Two variables were compared across three different groups of people: healthy controls, people with type 1 or type 2 diabetes, and those without diabetes, using a one-way analysis of variance. Pearson's coefficient correlation was used to examine the correlation between diabetic patients' serum creatinine and serum urea levels.

**Results**

For non-diabetic individuals, the standard deviation (SD) of anthropometric measurements was tallied. The mean SD of anthropometric measurements was recorded for diabetics. Three groups of subjects did not differ significantly in age, height, weight, or BSA.

Blood sugar levels in the control, Type 1 diabetes and Type 2 diabetes groups, as well as haemoglobin A1c levels, are also included in this analysis. Diabetics had significantly higher FBS and PBS levels than those in the control group. Compared to the control group, Type 1 and Type 2 diabetics had significantly higher HbA1c levels, with Type 1 diabetics having higher values than the Type 2 diabetics.

In this study, the mean standard deviation (SD) of serum creatinine and urea concentrations was compared to that of non-diabetics (controls), Type 1 diabetics (T1D), and Type 2 diabetics. There was a statistically significant difference in the levels of creatinine and urea in diabetic groups and control groups.

The relationship between HbA1c, serum urea and creatinine, and the duration of diabetes in people with IDDM/Type 1 diabetes and those with NIDDM/Type 2 diabetes is revealed by Pearson's coefficient correlation. When it comes to Type 1 diabetics, the higher the HbA1c level and the longer the duration of diabetes, the greater the correlation between serum urea and creatinine.

**Conclusion**

Serum creatinine and urea levels have been found to be linearly related in Type 1 diabetics with high HbA1c levels. Patients with diabetes should have their HbA1c, urea, and creatinine levels monitored. In diabetics, biomarkers like serum urea and creatinine are easy to obtain and can predict kidney function (a condition known as nephropathy).

**Reference**

1.Sharma A, Hirulkar NB, Wadel P, Das P. Influence of hyperglycemia on renal function parameters in patients with diabetes mellitus. Int J Pharm Biol Arch. 2011;2(2):734-9.

2. Mohan V, Shah S, Saboo B. Current glycemic status and diabetes related complications among Type 2 diabetes patients in India: Data from the achieve study. J Assoc Physicians India. 2013;61 Suppl 1:12-5.

3. Unnikrishnan RI, Rema M, Pradeep R, Deepa M, Shanthirani CS, Deepa R, et al. Prevalence and risk factor of diabetic nephropathy in an urban South Indian population; The Chennai urban rural epidemiology study (CurES-45). Diabetes Care. 2007;30:2019-24.

4. Ziyadeh FN. Different roles for TGF-β and VEGF in the pathogenesis of the cardinal features of diabetic nephropathy. Diabetes Res Clin Pract. 2008;82 Suppl 1:38-41.
5. Zhu Y, Usui HK, Sharma K. Regulation of transforming growth factor-beta in diabetic nephropathy: Implications for treatment. Semin Neprol. 2007;27(2):153-60.
6. Bohlender JM, Franke S, Stein G, Wolf G. Advanced glycation end products and the kidney. Am J Physiol Renal Physiol. 2005;289(4):F645-59.
7. Singh VP, Bali A, Singh N, Jaggi AS. Advanced glycation end products and diabetic complications. Korean J Physiol Pharmacol. 2014;18(1):1-14.
8. Mishra KP, Mawar A, Kare PK, Verma N. Relationship between fasting blood glucose, serum urea, serum creatinine and duration of diabetes in Type-2 diabetic patients. Flora Fauna. 2015;21(1):127-32.
9. Mittal A, Sathian B, Kumar A, Chandrashekharan N, Sunka A. Diabetes mellitus as a potential risk factor for renal disease among Nepalese: A hospital based case control study. Nepal J Epidermiol. 2010;1(1):225.
10. Anjaneyulu M, Chopra K. Quercetin, an anti-oxidant bioflavonoid, attenuates diabetic nephropathy in rats. Clin Exp Pharmacol Physiol. 2004;31(4):244-8