An observational case control study on dietary intake pattern and its relationship with serum creatinine for the risk of diabetes

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**ABSTRACT**

Introduction: Diabetes nephropathy is related to the renal disease and reduced filtration rate of glomerulus and elevated serum creatinine level. After many years of diabetes, filtration rate of kidney gradually decreases. Hypertension is diagnosed more frequent in patients with Type 2 diabetes than the patients without diabetes.

Objective: The aim of the study was to compare the association between elevated serum creatinine level with dietary intake pattern among patients with Type 2 diabetes and other patients (without diabetes).

Method: Serum creatinine level was measured in patients with Type 2 diabetes (case) and patients without diabetes (control), collected data with the help of predesigned pretested questionnaire containing sociodemographic, clinical parameters and food frequency questionnaire.

Result: There was a significant difference of serum creatinine level and eGFR level between cases and control. There was no statistically significant difference of creatininogenic food intake pattern between these two groups and there was no significant difference of correlation between these specific food intake pattern and elevated serum creatinine level. So, we conclude in our present study, that there is no significant relationship between creatininogenic food intake and onset of Type 2 diabetes.

**Keywords:** Diabetes, serum creatinine, dietary intake pattern, Glomerular filtration.

 **I. INTRODUCTION**

Creatinine is a chemical waste product in the blood that passes through the kidneys to be filtered and eliminated in urine. It is released from muscle tissue during muscle contraction and is a metabolic waste product eliminated readily through excretion by glomerular filtration.

Hypertension and Type 2 diabetes are common comorbidities. Hypertension is twice as frequent in patients with Type 2 diabetes compared with those who do not have diabetes.

Previous studies have not mentioned that creatinine levels will remain normal after eliminating certain foods. It is not properly mentioned in the previous studies, the relationship between dietary intake pattern with serum creatinine for the risk of Type 2 diabetes.

**II. PROPOSED ALGORITHM**

The study design is observational case control study and the study population is consisted of 40 subjects (case group: Admitted patient in IQ City Medical College & Hospital with Type 2 diabetes, control group: Admitted patient in IQ City Medical College & Hospital with other diagnosis). The subjects were excluded from the study who were not willing to participate, who were seriously ill and unable to speak, who can not understand English, Bengali or Hindi. The sampling technique of this study is Non probability consecutive sampling. Independent variables are included age, gender, BMI, diagnosis, Type 2 diabetes, and any type of comorbidity present or not, dietary intake pattern (frequency and amount of different creatininogenic food groups). Dependent variable is Serum creatinine level.

Study tools which are used,

* A predesigned pretested questionnaire containing sociodemographic, clinical parameters and Food frequency questionnaire.
* Medical records.
* Weighing machine & Non-stretchable measuring tape.

 **III. EXPERIMENT AND RESULT**

According to age, nearly half (10, 50%) of the cases were elderly whereas nearly one fourth (5, 25%) of controls were elderly. Most (9, 45%) of the controls are aged 40 to 60 years. However, this differential pattern of age among cases and controls was not statistically significant.

According to gender, in both Case and Control group 60% patients are male rest are female. Thus no significant difference was noticed between them according to gender.

According to Body Mass Index, in both Case and Control group majority of patients had normal BMI (85% compared to 75%). Mean (SD) BMI among cases were 22.6 (3.4) kg/m2 ranged from 16.7 to 33.0 kg/m2 with median of 22.6 kg/m2. Mean (SD) BMI among controls were 21.4 (2.3) kg/m2 ranged from 17.0 to 26.8 kg/m2 with median of 21.4 kg/m2. No statistically significant difference was noticed between these groups according to BMI.

According to Serum Creatinine, mean (SD) Serum Creatinine among cases were 2.44 (3.47) mg/dl ranged from 0.4 to 15.5 mg/ dl with median of 1.15 mg/dl. Mean (SD) Serum Creatinine among control were 0.93 (0.36) mg/dl ranged from 0.50 to 1.90 mg/dl with median of 0.85 mg/dl. This difference of serum creatinine level among cases and controls were statistically significant.

According to creatininogenic food intake mean (SD) creatininogenic food intake among cases were 22.0 (13.7) gm/kg body wt/week ranged from 6.9 to 52 gm/kg body wt/week with median of 18.9 gm/kg body wt/week. Mean (SD) creatininogenic food intake among controls were 16.6 (10.8) gm/kg body wt/week ranged from 4.2 to 52.6 gm/kg body wt/week with median of 14.3 gm/kg body wt/week. No statistically significant difference of creatininogenic food intake among cases and controls was noticed.

Positive but weak and statistically not significant correlation was noted between Serum creatinine and creatininogenic food intake in both case and control as well as combined groups. It means with increase in creatininogenic food intake there was increase in serum creatinine level though this change was statistically insignificant. Negative but weak and statistically not significant correlation was noted between eGFR and creatininogenic food intake in both case and control as well as combined groups. It means with increase in creatininogenic food intake there was decrease in serum creatinine level though this change was statistically insignificant.

**Discussion:**

After collecting the data we can see that in case group HbA1c level is elevated. Excess level of HbA1c has been significant risk factor for cardiovascular diseases in patients who may suffering from disbetes. In most of the patients it is shown that HbA1c level is more than 6.5%. The relationship between serum creatinine and cardiovascular disease is statistically significant so, we can say that Type 2 diabetes is also associated with elevated creatinine level. But the relationship between creatininogenic food intake and Type 2 diabetes is statistically insignificant. Because we only collected data by questionnaire method and did not actually measure what they are eating and because of the small sample size and they may had some other disease while in the hospital so their diet may have been compromised. Although there is some relationship, it is not completely significant for all this reasons.

**IV. CONCLUSION**

The relationship between serum creatinine and cardiovascular disease is statistically significant so, we can say that Type 2 diabetes is also associated with elevated creatinine level and no such difference was found for dietary pattern.

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