

Assessment of creatinine and urea blood levels in healthy volunteers

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Abstract

Introduction: Endogenous creatinine and urea are protein metabolism. Their levels in the blood reflect status of kidney Function. **Aim:** This study aimed to assess the serum creatinine and urea levels normal Sudanese adults Females in the University of Gezira, to identify influence of age, tribe and menstrual cycle on the level of their parameters. **Materials and Methods:** The study population consisted of 270 females of ages ranged between 18-40 year's. Blood samples were collected from all of them after their consents. Serum samples were taken and creatinine and urea levels were analyzed using spectrophotometric methods. **Results:** The results showed that the (mean \pm SD) serum creatinine and Urea levels were (0.82 \pm 0.10 mg/dl) and (20.2 \pm 4.7 mg/dl) respectively. Serum urea but not creatinine levels were significantly different ($P = 0.04$) for the different ages. Serum creatinine and urea levels varied with ethnic group and menstrual cycle. **Conclusion:** The results indicated that the mean levels of both these protein metabolites were within the ranges of their values for the normal kidney function.

Key words: Creatinine, female volunteers, Sudanese, urea

INTRODUCTION

Proteins are the most abundant components of human body and occupy a central position in architecture and functioning of living matter¹, Dietary and intracellular proteins in the body are metabolized into their building blocks, amino acids. Arginine, glycine and methionine are metabolized to form creatine which is primarily a high energy phosphate compound utilized for muscular contraction.² The level of creatinine in the blood is a good measure of the overall kidney function. When the kidneys are not normally working for any reason they become unable to excrete creatinine in urine, and

as a result, the level of creatinine in the blood rises.³ Blood urea estimation is one of the renal function tests. A significantly elevated plasma urea concentration is indicative of impaired glomerular function. Urea can be determined directly in plasma, serum and most other biological fluids.⁴ The objective of this study to assess the serum creatinine and urea levels in normal adult Sudanese Female.

MATERIALS AND METHODS

All of the females participating in the study were bled and their serum creatinine and urea levels were determined spectrophotometrically.

Volunteers

270 normal adults Sudanese females from Gezira University aged 18-40 years participated in the study for the determination of their serum creatinine and urea levels. 70 females were having their menstrual cycles, three were pregnant and 17 were lactating.

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Sampling

5 ml blood were collected from each subjects. The blood was centrifuged at 5000 r.p.m for 10 min. serum creatinine and urea levels in each sample were estimated spectrophotometrically.

Statistical analysis

All the results were analyzed by statistical analysis, using statistical package of social science (SPSS) to a significance value of ($P < 0.05$).

RESULTS AND DISCUSSIONS

The mean values of serum creatinine and urea levels for the 270 subjects were 0.82 ± 0.10 mg/dl and 20.2 ± 4.7 mg/dl.

The mean value for serum creatinine of the normal adult Sudanese adult females in University Gezira was 0.82 ± 0.10 mg/dl range of 0.3-1.25 mg/dl in the study subjects (Table 1). This value apparently agrees with values that were quoted by Ateig⁵ in Sudanese children, Erasmus *et al.*⁶ in Melanesian women and Jones *et al.*⁷ in United State women.

Mean serum creatinine concentrations were not significantly different between the four groups studied (Table 1) in agreement with Yoshid⁸ who assessed the effect of aging on renal function in the thirties to sixties years groups women. Erasmus *et al.*⁶, estimated the mean values and reference ranges of serum creatinine in their groups of Melanesian women and he found that there was no significant difference between the three groups. Feifeld⁹, found that the serum creatinine has not necessarily increased with time in the very elderly, even in those with mild azotemia, Fehrman¹⁰, conducted study on renal function in the elderly and serum creatinine didn't correlate with age. Aono *et al.*¹¹, estimated normal ranges of serum creatinine levels in old subjects and a young control group and he found (SCM) levels didn't correlate with age. In contrast the results of our study were not in agreement with those of Jones *et al.*⁷ who found differences in mean serum creatinine (SCM) levels at different ages.

The mean value for serum urea of normal adult Sudanese females in Gezira University was 20.2 ± 4.7 mg/dl and with a range of 10.8-33.0mg/dl (Table 2).

Mean serum urea concentration were significantly different between the four age groups studied (Table 2) in agreement with Ateig⁵, who estimated the normal values for serum urea in Sudanese children and he found that the urea values were significantly affected by age, where the values have decreased with increasing age. Yoshida⁽⁸⁾, who assessed the effect of aging on renal function in healthy women reported

Table 1: Mean concentrations of serum creatinine (mg/dl) of study subjects

Age	N	Mean \pm SD	Minimum	Maximum
18-23	175	0.82 \pm 0.10	0.4	1.25
24-29	53	0.80 \pm 0.12	0.3	1.04
30-35	26	0.84 \pm 0.17	0.7	1.05
36-40	16	0.87 \pm 0.04	0.7	1.02
Total	270	0.82 \pm 0.10	0.3	1.25

SD = Standard deviation

Table 2: Mean concentrations of serum urea (mg/dl) of study subjects

Age	N	Mean \pm SD	Minimum	Maximum
18-23	175	20.0 \pm 4.6	10.8	33.0
24-29	53	19.0 \pm 4.5	12.2	33.0
30-35	26	20.8 \pm 6.2	12.9	32.7
36-40	16	23.3 \pm 3.7	16.2	31.5
Total	270	20.2 \pm 4.7	10.8	33.8

SD = Standard deviation

that, women over the age of 50 years had significantly higher (BUN). Ano *et al.*⁽¹¹⁾, in a study estimated the normal ranges of BUN levels in old subjects and a young control group, showed that the mean BUN levels in the elderly subjects were significantly higher than those in the control groups. Fehrman-Ekholm and Skeppholm¹⁰, studying the renal function in the elderly, reported a strong correlation between serum urea levels and age.

The results of all published studies have demonstrated the increase of serum urea with age. This could be attributed to a decrease of body protein reserve by age leading to a decline of urea excretion.¹²

In this study serum urea was significantly increased with increasing age, however this was limited by the fact that no subjects with more than 40 years of age were included in the study.

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