

**Evaluation of Urea and Creatinine Levels in Chronic Renal Failure
in Wasit province**

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Abstract

Chronic kidney disease (CKD) is a chronic ailment resulting in a gradual and persistent worsening of the kidney functioning, which results in a substantial influence on the body fluid and electrolyte balance and the buildup of toxic wastes. The research was done in Wasit Governorate and in partnership with Al-Zahraa General Hospital and Martyr Dr. Fayrouz Hospital. A cross-section of sixty patients was selected, comprising patients with chronic kidney disease and healthy people and a range from 21 to 98 years old. A collection and analysis of samples were done at the laboratory, where urea and creatinine concentrations of the blood of the participants were examined. The percentages were used to depict the resulting data in terms of age groups, gender segregation (male and female), and urea and creatinine levels. The correlation between these health variables and kidney failure complications, such as anemia and blood pressure, was determined. Findings revealed that urea and creatinine levels were significantly surged in patients with kidney failure as compared to healthy people. That is an explicit indication of deterioration of kidney functions. It was also established that males showed more elevated creatinine levels than females, with females having more anemia levels. These findings show that monitoring biomarkers regularly is essential to reduce the complications of chronic kidney failure and improve the quality of life of patients.

Keywords: Urea levels, Creatinine levels, and Chronic Renal Failure.

1. Introduction

Kidney failure is also the state where the kidneys are unable to perform

their functions completely or partially and hence toxic substances and excess fluid accumulate in the body, and this

condition is a real threat to the health of the patient and can necessitate immediate medical treatment, either through dialysis or kidney transplant [1, 2].

Kidney impairment is classified into two main types. Acute Kidney Injury (AKI) and chronic kidney disease (CKD) [3-5]. Acute kidney injury is an emergency condition that occurs suddenly due to multiple causes, such as reduced blood flow to the kidneys, drug toxicity, or physical injury, and it is often treatable if medical intervention occurs in a timely manner. Chronic kidney disease, on the other hand, is a long-term gradual development that usually results from chronic conditions such as hypertension or diabetes [2, 3].

Common symptoms of chronic kidney failure include general fatigue, swelling in the limbs, shortness of breath, and nausea. As the condition progresses, more serious complications can appear, such as anemia, osteoporosis, and heart disease. The diagnosis of kidney failure relies on several laboratory tests, including kidney function tests such as blood creatinine measurement and glomerular filtration rate (GFR) tests, in addition to using medical imaging techniques to

assess the structure and condition of the kidney [3, 4].

Kidney failure is a chronic disease that poses a significant threat to public health and can arise from a variety of causative factors that lead to the deterioration of kidney function. The main causes include numerous environmental, genetic, and physiological factors that significantly affect kidney health. Among the most important of these factors are age, gender, and chronic diseases such as diabetes and high blood pressure [5-7].

Kidney failure diagnoses are considered essential steps in determining the level of kidney function deterioration and providing appropriate treatment. Diagnosing kidney failure includes a set of examinations and tests that help doctors understand the patient's health condition. a. Glomerular Filtration Rate (GFR) It is the primary measure for assessing kidney function. This rate measures the amount of blood that passes through the kidneys and is filtered per hour. A low GFR is considered one of the main indicators of kidney problems, as a low rate indicates a decreased ability of the kidneys to filter waste. Blood creatinine level is one of the easiest and most common ways to assess kidney function. Creatinine is a waste product resulting

from muscle activity and is excreted through the kidneys. When kidney function declines, creatinine levels in the blood accumulate. Elevated creatinine levels are usually associated with kidney problems such as acute or chronic kidney failure. Protein in urine (Albuminuria) the presence of protein (albumin) in the urine is considered an important indicator of kidney problems. Under normal conditions, protein only leaks into the urine in very small amounts. However, in cases of kidney failure or kidney injury, the kidneys begin to lose their ability to filter proteins properly. Albumin in the urine indicates kidney damage d. Glomerular Filtration Rate and Albuminuria. In cases of suspected kidney injury or renal failure, both the glomerular filtration rate and the level of albumin in the urine can be used to determine the severity of the condition. Total serum protein is a measure of the protein level in the blood. In cases of kidney function deterioration, protein levels in the blood may decrease due to protein loss through the urine (albumin) [5].

Both urea and creatinine are key indicators of kidney problems, but creatinine is more accurate in assessing the actual efficiency of the kidneys compared to urea. In some cases, urea levels may be elevated due to other

factors such as dehydration or increased protein intake, whereas creatinine is considered a more reliable direct indicator of kidney function deterioration. The urea-to-creatinine ratio (BUN / Creatinine Ratio) is commonly used to assess the condition, as a high ratio may indicate other causes of kidney failure, such as dehydration or reduced blood flow to the kidneys. In general, the higher the levels of urea and creatinine in the blood, the more deteriorated the kidney condition is [6, 7].

2. Materials and Methods

2.1 Data Collection

The study was conducted at the Wasit Health Directorate in collaboration with Al-Zahraa General Hospital, Dialysis Department, and the Excellence Laboratory in Al-Kut city, in addition to Dr. Fayrouz General Hospital in Wasit Governorate, as sites for sample collection. The study samples included individuals with chronic kidney failure and healthy individuals, 60 people from Wasit Governorate, aged between 21 and 98 years. Samples were divided into three age categories. From 21 to 50 years old, from 51 to 80 years old, and older than 80 years old. Then, samples were

further divided into two groups. The first group represented the control group, which included 30 healthy individuals, with numbers according to age categories being 8, 10, and 12 years old respectively. The second age group included 30 patients with chronic kidney failure, with numbers according to age categories being 8, 10, and 12 years old respectively. Where, the kidney failure diagnosis was confirmed by a specialist physician.

2.2 Data Analysis

Data collected from the participants in this study were analyzed to assess the levels of creatinine and urea in patients with chronic kidney failure. Data were presented as percentages to show the gender distribution (male and female) between the patient group and the healthy group. Additionally, the percentages of the decrease in creatinine and urea levels for both males and females way determined. The percentages for different age groups way also represented, along with a comparison of the prevalence of creatinine and urea across these age groups.

3. Statistical Analysis

Statistical tools were used included the percentage of renal failure to measure urea and creatinine levels in patients' group and healthy group. Microsoft Excel and SPSS were used to analyses the data across age and gender.

4. Results

4.1 Patients with Creatinine and Urea

The percentages of elevated urea and creatinine among male and female patients with kidney failure, with the percentage reaching 50% for both genders, and the average age of the patients ranging between 21 and 85 years old. Percentages of patients with kidney failure according to age groups, which are (21-50 years) reached 13.3%, while it was (51-80 years) reached 66.6%, and (≥ 80 years) reached 20%.

4.2 Healthy Individuals with Creatinine and Urea

Percentages of healthy individuals among males and females and average ages of patients, with percentage among males being 40%, while 60% among females, and the average ages of the patients ranged between 21 and 83 years old.

The percentages of healthy individuals according to age groups

which were 21-50 years old reached 30%. While 51-80 years reached 63.3%, and ≥ 80 years old reached 6.6%.

5. Discussion

The study findings revealed the incidence of creatine and urea was equally divided, with each having 50 percent of the response. This implies that gender does not play a critical role in the probability of being infected and hence other variables, including environmental conditions, personal hygiene, and general health status, may have a greater role in creating the disease. The mean age of the people with the infection was between 21 and 98 years, as it represents the range of the infection among various groups of people [9-11].

The analysis of the data in terms of age, established that the age group of 51-80 years had the highest rate of infection. The group of 80 years and above had rate of 20, and the group of 21-50 years had the lowest rate of 13.3. Such distribution implies that the older people are more vulnerable to infection, a fact that is explained by the fact that their body defenses weaken with age, not to mention that they may be predisposed to chronic diseases that predispose them to infection. This could be because the younger age groups have

a better immune system, hence the reason why the rate of infection is relatively lower, in addition to the fact that young people are having healthier lifestyles than the older people [12-14]. In the healthy group, findings indicated that the ratio of unaffected males was 40 percent and the ratio of unaffected females was 60 percent. This implies that women are not easily infected perhaps because of their biological and immune system or that there is a discrepancy in the way of life of both sexes. The mean age of the uninfected was between 21-83 years which is less than the average age of people infected thus confirming the hypothesis that the older the age, the higher the chances of being infected [8].

6. Conclusion

The research results reveal that chronic kidney disease (CKD) triggers a significant deterioration in renal functioning as indicated by high serum creatinine and urea levels in the patient when compared with healthy controls. This biochemical spurt illustrates a decreasing glomerular filtration rate because of kidney damage hence resulting in the overall body retention of the nephrotoxic metabolites. It is worth noting that the statistics show that the

level of creatinine among male patients is higher as compared to the level of creatinine among female patients, but the susceptibility of women to anemia due to chronic renal failure is also higher. Besides, it was discovered that age groups older than 60 years are the most affected by the worsening of kidney functions and the greatest increase in the levels of biomarkers, which contributes to an age-related aggravation of the pathology of renal failure. The latter observations represent the urgent need of regular monitoring of biomarkers (that is, urea and creatinine) in the early diagnosis of renal dysfunction, which may eventually avert the development of acute kidney injury and associated complications.

7. References

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