

**Original Research**

## **Evolution of Renal Function, Electrolyte Homological Parameters in Patients with Renal Failure at Albyda Medical Center**

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### **ABSTRACT:**

A total cases were collected from the kidney department that were obtained from Al-Bayda Medical Center between January 2022 to April 2023. This study included the follow-up of 60 cases with chronic renal failure, including (19 females and 41 males), where the mean ages 50.2 years, and 34 control group were collected from Thebes laboratory Shahat between October 2020 to February 2022 Where hematological parameters and biochemical marks were recorded. Data were analyzed with excel and Minitab 17 statistical software. The results were showed a significant P-value < 0.05



of hemoglobin percentage and platelet count where were (p-value 0.000) in patients with chronic renal failure compared with healthy group. Also, there were a significant in the concentration of renal function urea and creatinine of patients with renal failure. chronic disease compared with the healthy group. The results also showed a significant increase in the concentration of potassium and sodium ions in patients with chronic renal failure, compared with the healthy group. failure compared to the healthy group, as well as a decrease in calcium and albumin levels. In this study, Chronic renal failure is associated with different degrees of abnormality in hematological parameters that needs careful evaluation and management. Also, we need to many of investigation on healthy the patients with renal failure.

**KEYWORDS:** Renal Failure, Homological Parameters, Biochemical Markers.

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## INTRODUCTION

Renal failure is a process that expresses a loss of functional capacity of the nephrons, independently of its etiology (National Kidney Foundation,2002) ,(Worwag, Langston ,2004). Renal failure is a medical condition in which the kidney fails to adequately filter waste product from blood (Safa et al,2006). The kidneys are responsible for maintaining homeostasis in the body; kidney failure typically leads to derangements of fluid, electrolyte, and acid-base balance. That means the normal renal function is very important for homeostasis, so much so, that situations in which renal functions are impaired can be life threatening (Behrend et al,1996), (Bijlani,2004). Diseases of the kidneys are among the most important causes of death and disability in many countries throughout the world (Kirby, Rudloff ,2005). Morbidity however is by no means insignificant. Millions of persons are affected annually by non-fatal kidney diseases, most notably infections of the kidney or lower urinary tract, kidney stones and urinary obstruction. Twenty percent of all women suffer from infection of the urinary tract of kidney at some time in their lives and at least (1%) of the U.S. population develops renal stones (Charles ,Alpers,2004). There are two forms of renal failure: acute and chronic. Acute renal failure (ARF) is defined

conceptually as a rapid (over hours to weeks) and usually reversible decline in GFR that may occur either in the setting of preexisting normal renal function (“classic” ARF) or with preexisting renal disease (“acute on chronic” renal failure) (Lameire et al,2005), (Mehta,Chertow,2003). Acute renal failure is a frequent clinical problem with an increasing incidence, an unacceptably high mortality rate that has not improved in more than 40 years, and no specific treatment, yet renal failure is not the usual cause of death (Bellomo et al,2002),(Kelly,Molitoris,2000). Chronic kidney disease is an important cause of morbidity and mortality all over the world. Renal replacement therapy or dialysis in an individual with advanced chronic kidney disease is an important step in medical science. The initiation of dialysis intensely affects quality of life, incurs significant financial costs, and mandates the use of expensive dialysis resources. Other risks include accelerating the loss of residual renal function and dialysis related morbidities. The negative consequences of initiating dialysis can be especially deleterious in the elderly, who are very sensitive to lifestyle changes and suffer the highest overall complication rates and most shortened life expectancy on dialysis of any age group (USRDS,2006). Chronic kidney disease (CKD) is a global public health problem, with greater burden and very high cost of care especially in developing countries

like India. The National Kidney Foundation in India states that, kidney diseases rank 3<sup>rd</sup> amongst the life-threatening diseases after cancer and heart disease. About 200,000 persons landed into terminal kidney failure every year and millions more suffer from lesser forms of kidney diseases (Richard et al,1991), (National Kidney Foundation,2006). Chronic kidney disease is an important cause of morbidity and mortality all over the world. Renal replacement therapy or dialysis in an individual with advanced chronic kidney disease is an important step in medical science (USRDS,2006). ESRD is characterized by a decrease in GFR and evidence of less than 10% nephron function remaining. During hemodialysis (HD) essential kidney functions, such as the elimination of water and metabolic wastes as well as the correction of the electrolyte and acid/base state, are replaced by the artificial purification system. Elements such as Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>++</sup>, Mg<sup>+</sup>, Cl<sup>-</sup>, and H<sup>+</sup> must be kept in a rather narrow physiological range, otherwise life threatening events may occur. Kidney diseases are associated with a change in various biochemical and hematological parameters. Anemia parallels the degree of renal impairment and the most important cause is failure of renal erythropoietin secretion. Other factors include chronic blood loss, hemolysis and bone marrow (Locatelli et al,2007),(Eschbach et al, 1967). Kidney failure affects a wide range of tissues, organs, and vital activities, if it causes many complications, including anemia, bone diseases, cardiovascular diseases, and atherosclerosis , [Recent studies indicate that heart diseases may cause the death of 50% of patients with renal failure, especially with injury Diabetes or high blood pressure . Kidney failure is diagnosed by laboratory examination of kidney function, and sometimes by a renal biopsy . The main problem for patients with chronic renal failure is increased acidity of the blood with high levels of urea and nitrogenous compounds, and clinical uremia syndrome (intoxication resulting from the accumulation of

Nitrogenous wastes in the blood Kidney failure is treated by maintaining the internal balance of fluids and ions in the body through dialysis or kidney transplantation. (Asmaa ,2021). Signs and symptoms of acute kidney failure may include decreased urine output, although urine output may remain normal Sometimes fluid retention, causing swelling of the legs, ankles, or feet, shortness of breath, fatigue, confusion, and nausea weakness, irregular heartbeat, Chest pain or pressure, seizures and coma in severe cases Sometimes acute kidney failure causes no symptoms and is detected by laboratory tests for another reason. This study will evaluate some physiological changes in kidney patients, such as hematological and biochemical parameters.

## **MATERIALS AND METHODS**

A total of 60 cases with renal failure were collected from the kidney department that were frequent at Al-Bayda Medical Center between January 2022 to April 2023, 41 males and 19 females. Where hematological parameters and biochemical marks were recorded then compared with 34 control group, 9 males and 25 females were estimated. Finally, Data were analyzed with Minitab 17 statistical software. country should be provided. The procedures should be written in the past tense.

## **RESULTS AND DISCUSSION**

The total were 60 cases the mean age was 50.2 years, 41 males and 19 females, the mean age were 48.19 years and 53.7 years respectively. After the statistical analysis of the hematological parameters and biochemical marks of the patients with renal failure the following was concluded:

### ***Biochemical Markers***

It was found that, There were the significant in both urea and creatinine concentrations Serum of patients with chronic renal failure compared

to the control group, where were (p value = 0.000) as shown in the table1. While the electrolyte ( sodium "Na+", potassium "k+", chloride "cl-" and Calcium "Ca+" were no significant between patients group and control group.

Groups	Healthy group	Patients group	P- value
<b>Renal function test</b>	Number / mean/ SEM	Number/ mean/ SEM	0.000
<b>Urea</b>	31 / 31.8 / 3.7	59 / 126 / 4.7	
<b>Creatinine</b>	31 / 1.4 / 0.2	59 / 11.2 / 1.8	0.000
<b>Sodium (Na+)</b>	26 /136.38 /0.66	59 / 137.42 / 0.66	0.267
<b>Potassium (k+)</b>	27 /4.509 /0.14	59 / 5.59 /0.60	0.084
<b>Chloride (cl-)</b>	12 /101.79 / 0.99	58 / 104.7 /2.9	0.340
<b>Calcium (Ca+)</b>	10 /8.602 / 0.22	58 /8.28 /0.14	0.220

**Table 1.** Difference between Number /mean/ SEM and p.value of renal failure function and erythrocytes with patients and healthy controls.

**Homological Parameters:**

The results of the statistical analysis showed a significant in hemoglobin concentration (Hb) in a group of renal failure patients chronic disease compared with the healthy group, as in (Table.2) . While there were no significant in the white blood cell count, red blood count and platelets count with chronic renal failure patients compared to the healthy group as in (Table.2).

Groups	Healthy group	Patients group	P- value
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Homological parameters	Number /mean/ SEM	Number /mean/ SEM	
<b>White blood cells</b>	19 / 7.54 / 0.8	58 /6.41 /0.28	0.221
<b>Red blood cells</b>	9 / 4.61 / 0.84	19 /4.786 /0.18	0.843
<b>hemoglobin</b>	18 /12.56 /0.49	58 /8.68 /0.16	0.000
<b>Platelets</b>	19 248.8 /20	57/ 213.4 /12	0.141

**Table 2:** Difference between Number /mean/ SEM and p.value of homological parameters with patients and healthy controls.

In this study, the Significant were showed in renal function both urea and creatinine of patients with chronic renal failure compared to the healthy group where the significant was p-value = 0.000, p-value < 0.05 . This results are consistent with the results of many studies as study of Asmaa et al (2017), where the renal function test showed the significant p-value < 0.05. Also Through the results of the this study, it was found that there is a significant P-value < 0.05 in the concentration of hemoglobin Hb, which are indicators of anemia in patients With Chronic renal failure, many studies have indicated that anemia is one of the most important Complications that accompany chronic renal failure (Omer et al 2020). And Potassium and sodium ions among patients with chronic renal failure compared to a group healthy people, where the increase in potassium can be attributed to many reasons, including the role of in the kidney.

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### CONCLUSION

In summery this study, Chronic renal failure is associated with different degrees of abnormality in hematological parameters that needs careful evaluation and management. Also, we need to many of investigation on healthy the patients with renal failure.

### ACKNOWLEDGEMENT

We thank all the volunteers who participated in this study.

### ETHICS

The data was taken from the kidney department at Al-Bayda Medical Center with the approval of the head of the department while maintaining the confidentiality and privacy of patients.

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### المخلص

تم جمع بيانات 60 حالة من قسم الكلى في مركز البيضاء الطبي خلال الفترة من يناير 2022 إلى أبريل 2023. شملت هذه الدراسة متابعة 60 حالة مصابة بالفشل الكلوي المزمن (19 أنثى و41 ذكرًا)، بمتوسط عمر 50.2 سنة، بالإضافة إلى 34 حالة ضابطة تم جمعها من مختبر شحات في طيبة خلال الفترة من أكتوبر 2020 إلى فبراير 2022. تم تسجيل المؤشرات الدموية والكيميائية الحيوية، وتم تحليل البيانات باستخدام برنامجي Excel و Minitab 17 الإحصائيين. أظهرت النتائج فرقًا ذا دلالة إحصائية (قيمة  $P > 0.05$ ) في

نسبة الهيموجلوبين وعدد الصفائح الدموية (قيمة  $P = 0.000$ ) لدى مرضى الفشل الكلوي المزمن مقارنةً بالمجموعة الضابطة. كما لوحظ فرق ذو دلالة إحصائية في تركيز اليوريا والكرياتينين لدى مرضى الفشل الكلوي المزمن مقارنةً بالمجموعة الضابطة. أظهرت النتائج أيضًا زيادة ملحوظة في تركيز أيونات البوتاسيوم والصوديوم لدى مرضى الفشل الكلوي المزمن، مقارنةً بالمجموعة السليمة، بالإضافة إلى انخفاض في مستويات الكالسيوم والألبومين. في هذه الدراسة، يرتبط الفشل الكلوي المزمن بدرجات متفاوتة من الشدوذ في المؤشرات الدموية، مما يستدعي تقييمًا دقيقًا وإدارة فعالة. كما أننا بحاجة إلى إجراء المزيد من الأبحاث على المرضى الأصحاء المصابين بالفشل الكلوي.

**الكلمات المفتاحية:** الفشل الكلوي، المؤشرات الدموية، المؤشرات الحيوية الكيميائية.