Journal of Libyan Academy Bani Walid 2025
مجلة الأكاديمية الليبية بني وليد
e-ISSN: 3104-3860
Volume 1, Issue 4, 2025, Pages: 72-78
Website: https://journals.labjournal.ly/index.php/Jlabw/index

Prevalence of ABO blood grouping among chronic kidney disease patients on hemodialysis in Tripoli. Libya

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معدل انتشار فصائل الدم المختلفة بين مرضى الغسيل الكلوي في مستشفى طرابلس المركزي. ليبيا

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Received: 29-07-2025	**Accepted:** 22-09-2025	**Published:** 30-10-2025

Abstract

The kidneys are vital organs in the human body; therefore, any impairment in their function leads to disturbances in various bodily systems. Chronic kidney disease (CKD) is a progressive condition that worsens over time. In its advanced stage, patients require dialysis as a primary treatment option, since medication alone becomes ineffective.

Several previous studies have indicated a correlation between certain diseases—such as gastric ulcers and stomach cancer—and different blood groups. Accordingly, this study aimed to determine the most prevalent blood groups among hemodialysis patients attending the Dialysis Unit at Tripoli Central Hospital during the period from May 1st to July 31st, 2025.

Patient records were reviewed, and data were collected regarding demographic variables (such as age, gender, residence, and occupation), along with clinical data related to dialysis, including the underlying cause of renal failure, number of dialysis sessions per week, duration of dialysis dependency (in years), and each patient's blood group. The data were then entered into a statistical program for analysis.

The results showed that the study included 100 patients with end-stage renal disease undergoing regular hemodialysis at Tripoli Central Hospital. Of these, 60% were male and 40% female, with ages ranging from 32 to 77 years, and a mean age of 58.6 years.

The findings revealed that diabetes mellitus was the leading cause of renal failure, accounting for more than 59% of the cases. Moreover, 68% of the patients had been on dialysis for less than five years, 21% for five to ten years, and only 11% for more than ten years.

Regarding blood groups, blood group A was the most common among patients (59%), followed by group O (25%), group B (10%), and group AB (6%). Statistical analysis indicated no significant association between blood group distribution and patient gender (P-value > 0.05).
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Keywords: Hemodialysis, Glomerulonephritis, Tripoli, Blood Grouping.

الملخص

الكليتان تُعدّان من الأعضاء الحيوية في جسم الإنسان، ولذلك فإن أي خلل في وظائفهما يؤدي إلى اضطراب في وظائف الجسم المختلفة. يُعتبر مرض الكلى المزمن من الأمراض التي تتطور تدريجيًا بمرور الوقت، وفي مراحله الأخيرة يحتاج المريض إلى الغسيل الكلوي كخيار علاجي أساسي، إذ لا يعود العلاج الدوائي وحده كافيًا.

تشير العديد من الدراسات السابقة إلى وجود علاقة بين بعض الأمراض مثل قرحة المعدة وسرطان المعدة وفصائل الدم المختلفة. لذلك، هدفت هذه الدراسة إلى تحديد أكثر فصائل الدم انتشارًا بين مرضى الغسيل الكلوي الذين يترددون على وحدة الغسيل الكلوي بمستشفى طرابلس المركزي خلال الفترة من الأول من مايو إلى نهاية يوليو لسنة 2025.

تمت مراجعة ملفات المرضى وجمع البيانات المتعلقة بالخصائص الديموغرافية مثل العمر، الجنس، مكان السكن، والمهنة، بالإضافة إلى بيانات الغسيل الكلوي مثل أسباب الفشل الكلوي، وعدد الجلسات الأسبوعية، ومدة الاعتماد على الغسيل بالسنوات، إلى جانب فصيلة الدم لكل مريض. ثم أُدخلت البيانات إلى برنامج إحصائي لتحليلها.

أظهرت النتائج أن الدراسة شملت 100 مريض بالفشل الكلوي المزمن المعتمدين على الغسيل الكلوي في مستشفى طرابلس المركزي، حيث كانت نسبة الذكور 60% والإناث 40%، وتتراوح أعمارهم بين 32 و77 سنة بمتوسط عمر قدره 58.6 سنة.

كما بيّنت النتائج أن مرض السكري هو السبب الرئيسي للفشل الكلوي في أكثر من 59% من الحالات، وأن 68% من المرضى يخضعون للغسيل الكلوي لأقل من خمس سنوات، و21% لمدة تتراوح بين 5–10 سنوات، بينما 11% فقط لأكثر من 10 سنوات.

أما فيما يتعلق بفصائل الدم، فقد كانت فصيلة الدم A هي الأكثر شيوعًا بين المرضى بنسبة 59%، تلتها فصيلة الدم O بنسبة 25%، ثم B بنسبة 10% وAB بنسبة 6%. كما أظهرت التحليلات عدم وجود علاقة ذات دلالة إحصائية بين توزيع فصائل الدم وجنس المريض (P-value > 0.05).

الكلمات المفتاحية :الغسيل الكلوي، التهاب كبيبات الكلى، طرابلس، فصائل الدم..

Introduction.

Kidneys are vital organs of the body, they play an important roles in excretion of waste products and maintaining water and electrolytes balance, in addition, activation of some molecules, such as vitamin D takes place within the kidneys, kidney diseases can be acute or chronic.

Chronic kidney disease (CKD), which is also called chronic renal failure, it can be caused by either abnormal kidney functions and or abnormal structure of kidneys, to be defined as a chronic, the abnormalities must be at least for 3 months, the CKD affected 753 million people globally in 2016, 417 million females and 336 million males,[1] the onset of CKD usually gradual, with early a symptomatic presentations, but later the patients may complain of feeling tired, constipation, vomiting and loss of appetite .The underlying causes of CKD include diabetes mellitus, hypertension, glomerulonephritis and poly cystic kidney diseases.[2]Estimated glomerular filteration rate (e GFR) is one of an important tests, used in evaluation of kidney functions, the normal GFR is 120-130 ml\min, in patients with kidney impairment, this value decreased gradually with deterioration of kidney functions, at the end stage of kidney disease, this value could be below 15 ml\min, at this time, medical treatments are not so helpful and the dialysis should be started to save life of the patients, other investigations of chronic kidney diseases included urine test for albumin, blood urea , serum creatinine, electrolytes, complete blood count , serum calcium and vitamin D.[3]

Furthermore, Ultrasound or kidney biopsy may be advised to determine underlying causes, treatment modalities include medications to lower high blood pressure, such as, angiotensin converting enzyme inhibitors (ACE) inhibitors, Angiotensin 2 Antagonists and calcium channel blockers, in addition, medications lowering blood sugars and cholesterol may be used, loop diuretics used to reduce edema[4], if CKD became severe and not responding to medications, dialysis could be used, to replace the functions of diseased kidneys, dialysis can be peritoneal dialysis or hemo-dialysis.[5], the dialysis should be for a life, un less kidney transplantation is carried out..

The ABO blood group system classifies human blood groups in to 4 types, based on existence or absence of a particular antigens on the surface of red blood cells**, blood group type A,** which has A antigens and anti B

antibodies**, blood group type B**, which has B antigens and anti A antibodies, **blood group AB,** which has both A and B antigens and devoid of both anti A and B antibodies**, blood group O,** which has both anti A and B antibodies and devoid of both A and B antigens[6], that is why? Group A is called the **universal donor** and group AB called the **universal recipient** the ABO antigen system was using for blood transfusion and organ transplantation, there are also increasing evidence, developing over the past decades, these evidence suggests a role of these antigens in developing many diseases, such as some infections, neurological and vascular diseases[7], the distribution of ABO and Rh blood group varied according to the region and the race of the world, in Japan, the most prevalent blood group was blood type (A), whereas, the blood type (O) was the most common blood group among Chinese and Americans[8,9], many studies carried out before, to find out the association between ABO blood groups and chronic kidney diseases, the majority of these studies showed the prevalence of blood group O[11,12,13], while others, found the opposite results[10], therefore, we aimed in this study to determine the distribution of ABO blood groups among the CKD patients attending at dialysis unit of Tripoli central hospital. .

Material and methods.

This is an observational cross sectional, retrospective study among adult patients, attending for hemo- dialysis at Tripoli central hospital, in the period from **first of May to July 31,2025.**

Medical records of the patients were retrieved, about socio demographic characteristics, such as age, sex, etiology of chronic kidney diseases, medical co-morbidities and blood groups. The data were collected and analyzed, using social package for social sciences (SPSS)version 16.

Results.

Age of study population.

Our study included 100 CKD patients on hemodialysis, 3sessions per week, attending hemodialysis unit of Tripoli central hospital, their ages ranged between

(32-77) years, the mean age of study population was 58.6 years with standard deviation of 9.81 years, the mean blood urea level was with standard deviation of 62.01 mg\dl, on other hand, the mean serum creatinine level of cases was 4.89 mg\dl with standard deviation of 2.2 mg\dl

Table 1. Descriptive Statistics of age, serum creatinine and blood urea

	N	Minimum	Maximum	Mean	Std. Deviation
Age of study population	100	32.00	77.00	58.6000	9.81135
Serum creatinine level	100	1.20	11.00	4.8922	2.22677
Blood urea level	100	53.00	344.00	225.00	62.01526
Valid N	100				

Relation between age of study cases and their blood urea level and serum creatinine level.

By studying the correlation between age of cases and their blood urea and serum creatinine, it was significant (p value = .000 and 0.009) respectively.

Table 2.Statistical Correlation between age of cases and blood urea level

		Age of study population	Blood urea level
Age of study population	Pearson Correlation	1	-.327**
	Sig. (1-tailed)		.000
	N	100	100
Blood urea level	Pearson Correlation	-.327**	1
	Sig. (1-tailed)	.000	
	N	100	100

Table 3. Statistical correlation between age of cases and serum creatinine level.

		Age of study population	Serum creatinine level
Age of study population	Pearson Correlation	1	-.238**
	Sig. (1-tailed)		.009
	N	100	100
Serum creatinine level	Pearson Correlation	-.238**	1
	Sig. (1-tailed)	.009	
	N	100	100

Sex (gender) of study population.
60% of study populations were males and 40% were females.

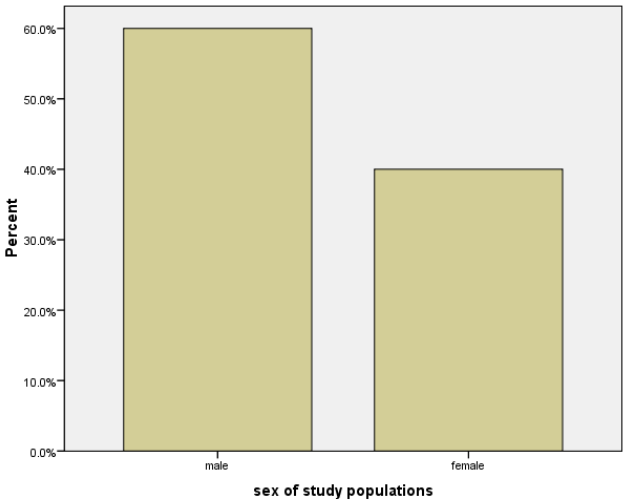

Figure 1. sex of study population

Relation between sex of study population and blood urea level.
By studying the correlation between sex of study population and blood urea level, it was significant(p value=0.01)
Table 4. statistical correlation between sex of study population and blood urea level.

Relation between sex of study population and blood urea level.
By studying the correlation between sex of study population and blood urea level, it was significant(p value=0.01)

Table 4. statistical correlation between sex of study population and blood urea level.

		sex of study populations	**blood urea level**
sex of study populations	Pearson Correlation	1	-.296**
	Sig. (1-tailed)		.001
	N	100	100
blood urea level	Pearson Correlation	-.296**	1
	Sig. (1-tailed)	.001	
	N	100	100

Relation between sex of study population and serum creatinine level.
By studying the sex of study population and serum creatinine, it was significant (p value=0.04)

Table 5. Statistical correlation between sex of study population and serum creatinine level

		sex of study populations	serum creatinine level
sex of study populations	Pearson Correlation	1	-.264**
	Sig. (1-tailed)		.004
	N	100	100
serum creatinine level	Pearson Correlation	-.264**	1
	Sig. (1-tailed)	.004	
	N	100	100

Blood groups distribution of study population.
59% of study populations had blood group type (A) , 10% had blood group type (B), only 6% had blood group (AB) and 25% of cases had blood group

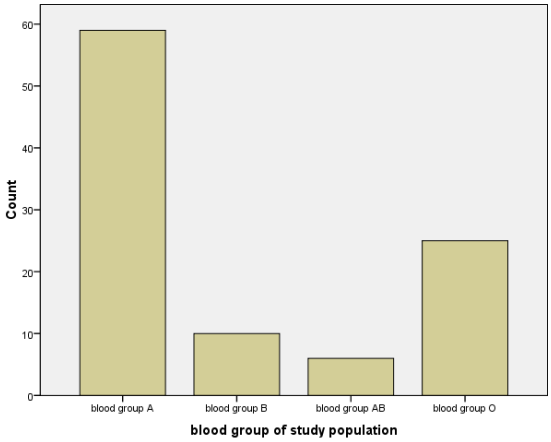

Figure 2. Blood groups distribution of study population.

Blood groups distribution by sex.

The most common type of ABO blood grouping was type A blood group, its prevalence was 59%,(34% and 25%) in males and females respectively, the second one is blood group O with prevalence of 25%, (16% and 9%) in males and females respectively, the blood group type B prevalence was 10%, 5% in males and 5% in females, finally, the prevalence of blood group AB was 6%, 5% and 1% in males and females respectively, the correlation between all blood groups and gender of cases was not significant as in table 4.

Table 6. blood group distribution by the sex.

Blood group	Males		Females		P value	Significance
	Count	Percent	Count	Percent		
Type A	34	34%	25	25%	0.283	Not significant
Type B	5	5%	5	5%	0.251	Not significant
Type AB	5	5%	1	1%	0.117	Not significant
Type O	16	16%	9	9%	0.321	Not significant

Causes (etiology) of CKD.

Diabetes mellitus was the most common cause of CKD cases on hemodialysis, where 59% of CKD cases had diabetes mellitus alone, 18% of cases had both diabetes and hypertension and 7% had diabetes and glomerulonephritis, in contrast, only 5% of cases had hypertension , 7% of cases had glomerulonephritis only and 6% had both hypertension and glomerulonephritis

Table 7.causes(etiology) of CKD

	Frequency	Percent	Valid Percent	Cumulative Percent
Diabetes mellitus	59	59.0	59.0	59.0
Hypertension	5	5.0	5.0	64.0
Glomerulonephritis	5	5.0	5.0	69.0
Diabetes and Hypertension	18	18.0	18.0	87.0
Diabetes and Glomerulonephritis	7	7.0	7.0	94.0
Hypertension and Glomerulonephritis	6	6.0	6.0	100.0
Total	100	100.0	100.0	

Duration in years on hemodialysis.

68% of patients on hemodialysis for less than 5 years, where as 21% of patients for 5-10 years and only 11% of patients on hemodialysis for more than 10 years.

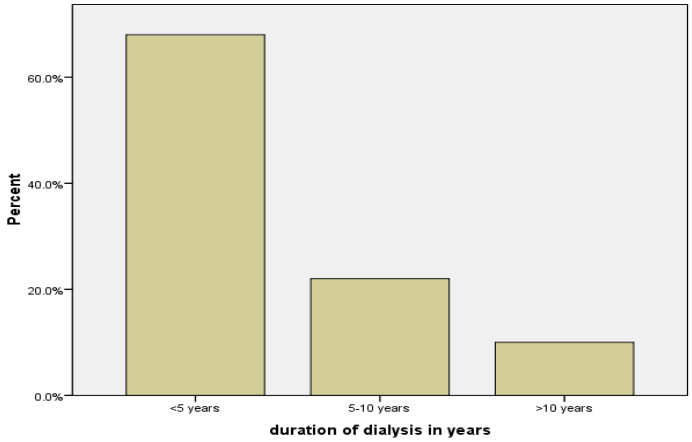

Figure 3. Duration of dialysis in years.

Discussion.

Our study was a cross sectional study, conducted on 100 patients with chronic kidney diseases on hemo-dialysis at dialysis unit of Tripoli central hospital. 60% of cases were males and 40% were females, diabetic nephropathy was the most common underlying cause of end stage kidney disease in (59%) of cases, blood group (A) was the most prevalent blood group among hemo-dialysis patients in Tripoli, some previous studies showed that blood group (A) was the most prevalent blood group among the patients with CKD, other studies found that blood group (O) was the most common type among these patients.

In Tripoli –Libya, Azab Elsayed and et al[10] conducted the study, which involved 250 chronic kidney disease patients on hemo dialysis, the most prevalent blood group in this study was blood group A (52.4%), which is in consistent with our results, this study also revealed no significant difference in prevalence of ABO blood grouping between chronic kidney disease patients and controls (healthy group)

In Syria, study conducted on 231 hemodialysis patients in Latakia , the study showed blood group (O) in 118 (51.1%), blood group (A) in 71 patients (30.7%), blood group (B) in 34 patients (14.7%) and only 8 patients (3.5%) had (AB) blood group, which is not consistent with our study.[11]

In Emirates. Fakhriya Alalawi and et al carried out the study, included 224 hemodialysis patients in Dubai, 59.8% of the patients were males, diabetic nephropathy was the etiology of end stage kidney disease in 46%, which is consistent with our results, in this study, the blood group (O) was the commonest (45%), which is in consistent with our results.[12]

Another study was conducted by **Alaa Mufaq Musleh and et al[13], in Saladdin Governorate**, this study included 150 patients with end stage CKD, 50% males and 50% females, the study showed the distribution of ABO blood groups among the patients with CKD as follows, the most dominant blood group was blood group (O) in 66.7% of the patients, which is not consistent with our results, 30% of the patients had blood group type (A), 11.3% and 2% of the patients had blood group (B) and (AB) respectively.

Nazzla Abd Alhammed H and et al[14], conducted the study on 50 CKD patients on hemodialysis, at kidney center in Shendi town, Sudan, the study revealed that, 44% of the patients were blood group (O), 38% were blood group (A) , 16% were blood group (B) and only 2% were blood group (AB), which is not consistent with our study.

Conclusion.

Our study revealed that diabetic nephropathy was the most common underlying cause of end stage kidney disease, the blood group type (A) was the most prevalent blood group among chronic kidney diseases patients on Hemo-dialysis in central hospital of Tripoli, furthermore, the relation of distribution of blood groups with gender of patients was not significant.(p value>0.05).

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Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.