

## Associated Factors Of Chronic Renal Failure Among Patients Admitted To Babylon Teaching Hospitals

Lobna Adil Al-Noori\*<sup>1</sup>, Hasan Alwan Baiee\*<sup>2</sup>, Jinan Rasheed Alwash\*<sup>3</sup>,  
Sajjad Mushhen Ghazi<sup>4</sup>, Thamer Amer Mahdi<sup>5</sup>, Ehab Ali Mohammed<sup>6</sup>, Mohammed Ali  
Mohammed<sup>7</sup>, Saad Thamer Mohammed<sup>8</sup>

1,2,3,4,5,6,7,8 Nursing Department, Hilla University College, Iraq

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### Abstract:

**Background:** Chronic kidney disease is not uncommon condition in which there is a loss of kidney function over time. End-stage renal disease is characterized by a decline in kidney function that necessitates the use of renal replacement therapies such as hemodialysis. Renal failure was more common and had a higher incidence rate in Iraq.

**Methodology:** A descriptive cross-sectional study among adult's patients with end-stage renal disease (eGFR < 15 mL/min/1.73m<sup>2</sup>) was conducted. A convenient sample of patients diagnosed with end-stage renal disease who were receiving hemodialysis treatment in Kidney dialysis Centers at Marjan Medical City and Imam-Alsadiq Teaching Hospital were enrolled in this study. Each participant was interviewed using a pretested questionnaire that included three categories of questions: the first category was related to socio-demographic characteristics, clinical manifestations, and life style; the second was about medical history and complications of the disease. The data collection continued for the period that starting on 1<sup>st</sup> January 2021 through 1<sup>st</sup> March 2021.

**Results:** A convenience sample of (96) patients were studied with a mean age of 52.62 (SD = 14.98) years and more than half (53.1%) were males. Most of the participants (30.2%) were with primary school, followed by (28.1%) were illiterate, while only (11.5%) had a college level of education or higher. The majority (86.5%) were unemployed and the highest percentage (36.5%) of the participants were with insufficient monthly income, (29.2%) of them were tobacco smokers. Their mean ( $\pm$ SD) duration of smoking (years) was (16.32 $\pm$ 10.8). The most common statistically and positive associated factors for renal failure were hypertension (50%), diabetes mellitus (44.8%), nephritis (32.3%) and aging  $p < 0.05$ .

**Conclusion:** More than half of patients were above fifty years old, and males were slightly higher than females. The majority of patients were with low education, and the highest percentage were unemployed with insufficient monthly income. The three most common conditions associated with renal failure were hypertension, diabetes, nephritis.

**Keywords:** Renal Failure, Hemodialysis. Associated factors, Hospitalized, Babylon, Iraq

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### Introduction:

Renal functions and the existence of kidney damage are used to assess kidney disease(1). Chronic kidney disease (CKD) is a prevalent illness in which kidney function gradually deteriorates. CKD is linked to an increased risk of a number of co-morbidities, including but not limited to cardiovascular disease (2).

CKD is becoming more frequent in both developed and underdeveloped countries (3). The difficulties of CKD are intertwined with the interplay of CKD with other chronic illnesses and mortality, this risk of mortality increases exponentially as kidney function deteriorates(4).

End-stage renal disease (ESRD) is characterized by a loss of kidney function that necessitates the use of renal replacement treatments such as hemodialysis, peritoneal dialysis, or kidney transplantation (5). Because pre-emptive transplantation as an initial modality is not widely accessible, dialysis is the most common kind of kidney replacement therapy for the majority of patients. Hemodialysis is the most widely utilized dialysis therapy worldwide (6). This study was carried to assess the factors associated with chronic renal failure and to identify the association between life style variables and causes of renal failure.

#### **Methodology:**

A descriptive cross-sectional design was used for data collection of ESRD hospitalized patients admitted in two Teaching Hospitals (Marjan Medical City and Imam-Alsadiq Teaching General Hospital). These hospitals are located in AL-Hillah city, Babil Governorate which is about 125 kilometers south of Baghdad, the capital of Iraq. It has an area of 5119 km<sup>2</sup>, with 1,728,132 population (7). The renal centers in these hospitals provide renal replacement therapy services: hemodialysis, peritoneal dialysis.

The data collection started from 1<sup>st</sup> January 2021 through 1<sup>st</sup> March 2021.

A convenient consecutive sample of (96) patients with chronic renal failure was selected. The investigators use this approach to recruit participants based on their availability and accessibility during the period of the study(8).

SPSS-25, was used to analyze the data (Statistical Packages for Social Sciences- version 25). Simple frequency, percentage, mean, standard deviation, and range measures were used to present the data.

The Pearson Chi-square test ( $\chi^2$ -test) was used to determine the significance of differences between percentages (qualitative data). P value less than 0.05 considered as a statistically significant difference.

#### **Results:**

**Table 1:** summarizes the socio-demographic characteristics of the participants. Of the total 96 participants, the mean age of the study patients was 52.62 years (SD = 14.98), and the highest percentage was found among those aged between (51-60) years, more than half of them were males 51 (53.1%), while 45 (46.9%) were females. Most of the participants 29 (30.2 %) have primary school level of education, followed by 27 (28.1%) are illiterates, while only 11 (11.5%) have attended a college or higher education. Regarding the employment status, the majority 83 (86.5%) are unemployed, while only 13 (13.5%) are employed. The highest percentage 35 (36.5%) of the participants have insufficient monthly income. Most of the patients were living in urban areas 50(52.1%).

**Table (1): Distribution of patients with Renal Failure according to Socio-demographic characteristics**

		Frequency	Percent
Age groups	≥ 20 years	3	3.1
	21-30 years	8	8.3
	31-40 years	5	5.2
	41-50 years	19	19.8
	51-60 years	33	<b>34.4</b>
	> 60 years	28	29.2
	<b>Mean ±SD</b>	<b>52.62±14.98</b>	
Gender	Male	51	53.1
	Female	45	46.9
Occupational	Employer	13	13.5
	Non-employer	83	86.5
Residence	Urban	50	52.1
	Rural	46	47.9
Level of educational	Illiterate	27	<b>28.1</b>
	Primary	29	<b>30.2</b>
	Intermediate	14	14.6
	Secondary	15	15.6
	College and Higher	11	<b>11.5</b>
Monthly income	Sufficient	33	34.4
	Insufficient	35	<b>36.5</b>
	Somewhat	28	29.2

	sufficient		
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**Table 2:** shows the distribution of patients according to their life style, (33.3%) of patients are smoker. Their mean ( $\pm$ SD) duration of smoking ( $16.32 \pm 10.82$  years).

**Table (2): Distribution of patient with Renal Failure according to Life Style**

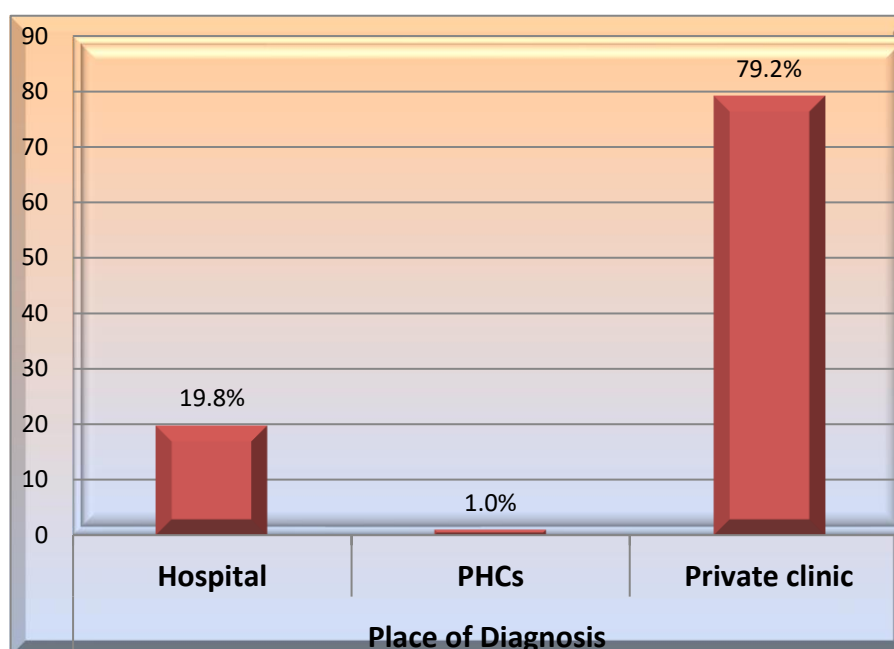
Life Style		Frequency	Percent
Are you smoking	Yes	32	33.3
	No	64	66.7
Type of Smoking	Cigarette	28	29.2
	Hookah	4	4.2
Duration of smoking per years	<10 years	10	10.4
	10-20 years	11	11.5
	21-30 years	8	8.3
	>30 years	3	3.1
	Mean $\pm$ SD	16.32 $\pm$ 10.82	
Are you drink alcohol	Yes	-	-
	No	96	100.0

**Table 3:** shows the distribution of the patients according to their medical history, the majority of the patients 64 (66.7%) have hypertension, followed by 41 (42.7) who are diabetics, and 24 (25%) have cardiovascular diseases. (18.7%) with kidney stones. 19.7% of patients have positive family history of kidney failure.

**Table (3): Distribution of patient with Renal Failure according to Medical history**

Medical history		Frequency	Percent
Diabetes Mellitus	Yes	41	42.7
	No	55	57.3
Hypertension	Yes	64	66.7
	No	32	33.3
Cardiovascular Diseases	Yes	24	25.0
	No	72	75.0

Is there a person in the family with kidney failure?	Yes	19	19.8
	No	77	<b>80.2</b>
Does the patient suffer from kidney stones?	Yes	18	18.8
	No	78	<b>81.3</b>



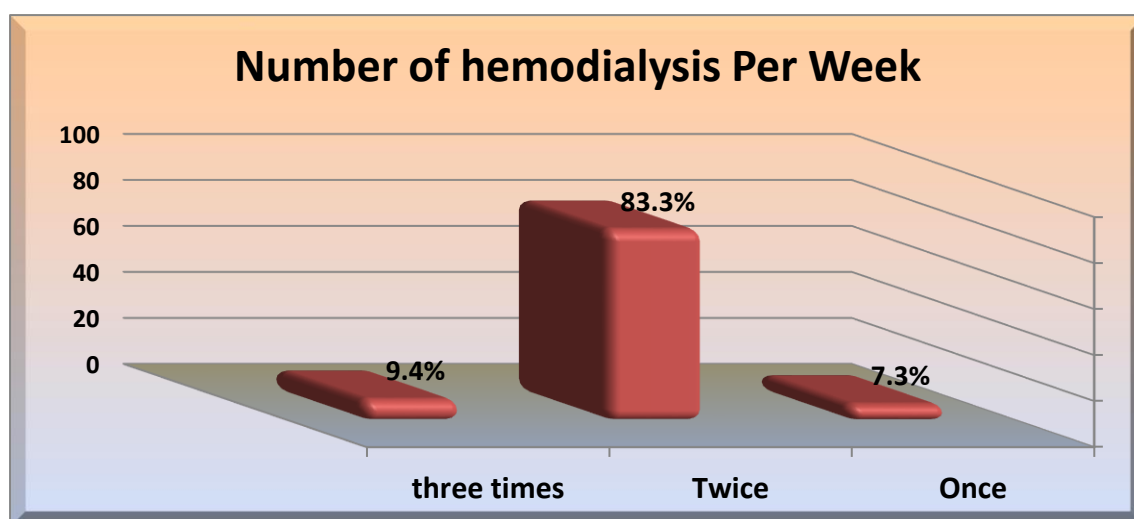
**Figure (1): Distribution of patients with Renal Failure according to Place of Diagnosis**

Regarding the distribution of the participants to place of diagnosis, the majority (79.2%) reported that they were diagnosed at private clinics, followed by (19.8%) were diagnosed at hospitals, and only (1%) were diagnosed at primary health carecenters. **(Figure 1).**

**Table 4:** shows the distribution of patients according to number of hemodialysis. The Mean ( $\pm$ SD) frequency of hemodialysis per week was ( $2.02 \pm 0.40$ ) ranging from (1-3), most of the patients with renal failure 80 (83.3%) are with twotimes hemodialysis per week, followed by 9 (9.4) with three times hemodialysisweakly, and only 7 (7.3) of them doone hemodialysis per weakas shown in **(Fig.2).**

**Table (4): Distribution of patients with Renal Failure according to Number of hemodialysis**

		Frequency	Percent
Number of hemodialysis Per Week	Once	7	7.3
	Twice	80	83.3
	three times	9	9.4
	<b>Mean <math>\pm</math>SD (Range)</b>	<b>2.02<math>\pm</math>0.40 (1-3)</b>	



**Figure (2)** Distribution of patient with Renal Failure according to Number of hemodialysis

**Table 5:** with regard to the duration of renal failure, the majority 70 (72.9) patients have renal failure for more than five years, while only 5 (5.2) patients have the disease for more than ten years. The Mean ( $\pm$ SD) duration of disease was (3.53 $\pm$ 4.49).

**Table (5):** Distribution of patients with Renal Failure according to Duration of disease

		Frequency	Percent
Duration of disease	<5 years	70	72.9
	5-10 years	21	21.9
	>10 years	5	5.2
	Mean $\pm$ SD	3.53 $\pm$ 4.49	

**Table 6:** shows the distribution of the participants according to the associated chronic diseases with renal failure, the majority of the patients 48 (50%) had hypertension, 43 (44.8%) patients had diabetes, 31 (32.3%) had nephritis, 5 (5.2%) had urethral or ureteral obstruction, 4 (4.2%) were with birth defects, while only 2 (2.1%) patients with uncertain factors.

**Table (6):** Distribution of patient with Renal Failure according to the associated comorbidities.

Associated comorbidities		Frequency	Percent
Diabetes Mellitus	Yes	43	44.8
	No	53	55.2
Arterial Hypertension	Yes	48	50.0
	No	48	50.0
Nephritis	Yes	31	32.3

	No	65	67.7
<b>Urethral or ureteral obstruction</b>	Yes	5	<b>5.2</b>
	No	91	94.8
<b>birth defects</b>	Yes	4	<b>4.2</b>
	No	92	95.8
<b>Uncertain (Unknown) Factors</b>	Yes	2	<b>2.1</b>
	No	94	97.9

**Table 7:** Regarding the complications of patients with renal failure, the highest percentage 78 (81.3%) patients had anemia, followed by 66 (68.8%) patients had hypertensive, 29 (30.2%) patients had heart failure, and only 14 (14.6%) patients had myocardial infraction.

**Table (7): Distribution of patient with Renal Failure according to Complications**

<b>Complications</b>		<b>Frequency</b>	<b>Percent</b>
<b>Anemia</b>	Yes	78	<b>81.3</b>
	No	18	18.8
<b>Hypertensive</b>	Yes	66	<b>68.8</b>
	No	30	31.3
<b>Heart failure</b>	Yes	29	<b>30.2</b>
	No	67	69.8
<b>Myocardial infraction</b>	Yes	14	<b>14.6</b>
	No	82	85.4

**Table 8:** There was a significant relationship between Urethral or ureteral obstruction and smoking status, (80%) of patients with Urethral or ureteral obstruction were smokers, while (20%) were not smoking,  $\chi^2(1) = 5.169$ ,  $p = 0.023$ . non-significant association was observed between smoking status and other variables  $p$  value  $> 0.05$ .

**Table (8) Association between tobacco smoking habit and renal failure**

<b>Causes</b>			<b>Smoker</b>	<b>Non-smoker</b>	<b><math>\chi^2</math></b>	<b>P. value</b>
<b>Diabetes</b>	Yes	No	17	26	1.348	0.246
		%	39.5%	60.5%		

	No	No	15	38		
		%	28.3%	71.7%		
<b>Hypertension</b>	Yes	No	20	28	3.000	0.083
		%	41.7%	58.3%		
	No	No	12	36		
		%	25.0%	75.0%		
<b>Nephritis</b>	Yes	No	10	21	0.024	0.877
		%	32.3%	67.7%		
	No	No	22	43		
		%	33.8%	66.2%		
<b>Urethral or ureteral obstruction</b>	Yes	No	4	1	5.169	<b>0.023*</b>
		%	80.0%	20.0%		
	No	No	28	63		
		%	30.8%	69.2%		
<b>birth defects</b>	Yes	No	0	4	2.087	0.149
		%	0.0%	100.0%		
	No	No	32	60		
		%	34.8%	65.2%		
<b>Unknown</b>	Yes	No	0	2	1.021	0.312
		%	0.0%	100.0%		
	No	No	32	62		
		%	34.0%	66.0%		

**Table 9:** shows association between the duration of renal failure and complications, there was non-significant association between anemia, hypertensive, heart failure, and myocardial infraction with duration of the disease p value > 0.05.

**Table (9) Association between Duration of disease and Complications of renal failure**

Complications			Duration of disease			X2	P. value
			<5 years	5-10 years	>10 years		
<b>Anemia</b>	Yes	No	54	19	5	3.102	0.212
		%	69.2%	24.4%	6.4%		



	No	No	16	2	0		
		%	88.9%	11.1%	0.0%		
<b>Hypertensive</b>	Yes	No	46	17	3	1.934	0.380
		%	69.7%	25.8%	4.5%		
	No	No	24	4	2		
		%	80.0%	13.3%	6.7%		
<b>Heart failure</b>	Yes	No	19	7	3	2.514	0.284
		%	65.5%	24.1%	10.3%		
	No	No	51	14	2		
		%	76.1%	20.9%	3.0%		
<b>Myocardial infraction</b>	Yes	No	9	5	0	2.456	0.293
		%	64.3%	35.7%	0.0%		
	No	No	61	16	5		
		%	74.4%	19.5%	6.1%		

**Table 10:** presents association between causes of renal failure and gender, there was statistically significant association between gender and Urethral or ureteral obstruction,  $\chi^2(1) = 4.654$ ,  $p = 0.031$ . While, non-significant associations were between gender and other variables  $p$  value  $> 0.05$ .

**Table 10: Association between causes of renal failure and gender**

Association between comorbidities of renal failure and gender						
			Gender		$\chi^2$	P. value
			Male	Female		
<b>Diabetes</b>	Yes	No	24	19	0.226	0.634
		%	55.8%	44.2%		
	No	No	27	26		
		%	50.9%	49.1%		
<b>Hypertension</b>	Yes	No	25	23	0.042	0.838
		%	52.1%	47.9%		
	No	No	26	22		
		%	54.2%	45.8%		
<b>Nephritis</b>	Yes	No	15	16	0.413	0.521
		%	48.4%	51.6%		

	No	No	36	29		
		%	55.4%	44.6%		
<b>Urethral or ureteral obstruction</b>	Yes	No	5	0	4.654	0.031*
		%	100.0%	0.0%		
	No	No	46	45		
		%	50.5%	49.5%		
<b>birth defects</b>	Yes	No	2	2	0.016	0.898
		%	50.0%	50.0%		
	No	No	49	43		
		%	53.3%	46.7%		
<b>Unknown</b>	Yes	No	1	1	0.008	0.929
		%	50.0%	50.0%		
	No	No	50	44		
		%	53.2%	46.8%		

**Table 11:** shows the association between monthly income and kidney stones, there was non-significant association between the two variables.

**Table (11): Association between monthly income and kidney stones.**

			Monthly income			X2	P. value
			Sufficient	Insufficient	Somewhat sufficient		
Does the patient suffer from kidney stones?	Yes	No	5	7	6	0.448	0.799
		%	27.80%	38.90%	33.30%		
	No	No	28	28	22		
		%	35.90%	35.90%	28.20%		

### Discussion:

In this study, the average age of the study patients was 52.62 years (SD = 14.98), and the highest percentage was found among the age group (51-60) years. This finding is similar cross-sectional study conducted in Rwanda (9) among End Stage Renal Disease (ESRD) patients, where the highest proportion (27%) aged between 51 and 60 years. Similarities can also be found in cross-sectional study in seven dialysis centers in Sulaimani governorate, Iraq by Sharif et al., (2017)(10) Among a

total of 227 hemodialysis patients, reported that More than half of ESRD patients were aged 50 years and older.

The present study showed that more than half of participants are males. These result is in consistent with a previous study conducted in Iraq among sample of 243 hemodialysis patients (11) the researchers reported that 57% were males. Men have a greater frequency of end-stage renal disease and have a more severe form of CKD. Sex hormones are considered to play a key role in the molecular mechanisms behind gender differences in CKD prevalence and features (12).

Regarding educational level, most of the participants with primary school, followed by illiterate, while only 11 have attended colleges or higher education. Previous study linked low educational level with higher rates of incident CKD (13). An Iraqi study conducted byAlaugili, (2015)(14)showed that the majority (74.9%) had low education (illiterate or primary school graduates), while only (8.2%) had higher education.

In agreement with previous studies (15–18). In this study, the majority are unemployed, while only 13 (13.5%) were employed. In addition, the highest percentage of the participants were with insufficient monthly income. Previous study argued that a lower income that closely associated with prevalence and progression of CKD (19). These results agreed with a cross-sectional study conducted byKim et al., (2021)(20) who reported that the majority where with low monthly income.

In this study, most of the subjects were living in urban places. This finding is consistent with prior a study conducted in Iraq, in which (63.8%) of participants came from urban areas and in a study conducted in England in 2018 among CKD patients with different stage, the majority (86.7%) of the respondents were living in an urban area(14,21). A study carried out byPaulyet al., 2020(22)reported that more patients were in rural areas (70.50%), which is in contrast to this study finding . These differences might be due to lifestyles and environmental factors between countries or the nature of the studied sample.

Regarding smoking habit (33.3%) patients were smoker. Of those 28. Their mean ( $\pm$ SD) duration of smoking are ( $16.32 \pm 10.82$ ); the majority 11 (11.5) were smoking for (10-20) year. Similar result was found in a prospective cohort study byWyldet al. (2019)(23)where among 1112 participants with CKD, findings revealed that the highest percentage (52%) had never smoked.

Regarding medical history of the participants, the two thirds of participants are hypertensive patients,followed (42.7%) were with diabetes mellitus, and (25%) were with cardiovascular disease. These results are higher than the findings of previous Iraqi study (11) Out of the 104 patients, 35 (34%) had diabetes, 23 (22%) had hypertension and diabetes, while the remaining . Whereas, findings

of this study go in line with those of a study by Lee et al. (24) who found that hypertension (66.4%), diabetes (33.2%), and hyperlipidemia. Our findings are similar with Indian study which depicted the same comorbidities (22).

In the present study, the Mean ( $\pm$ SD) frequency of hemodialysis per week was ( $2.02 \pm 0.40$ ) ranging from (1-3), most of the patients with renal failure 80 (83.3%) were with twice time hemodialysis per week, followed by 9 (9.4) were with three times hemodialysis, and only 7 (7.3) were one times hemodialysis. These results disagree with previous Iraqi study by Sharif et al., (2017)(10) in which, about two thirds of ESRD patients had dialysis three times per week. Si.

In this study, the majority of patients were with renal failure for more than five years, while only 5 (5.2) patients were with renal failure for more than ten years. The Mean ( $\pm$ SD) duration of disease was ( $3.53 \pm 4.49$  years). These results agree with the finding of other researchers Mukakarangwa et al., (2018).

Regarding the complications of patients with renal failure, the highest percentage 78 (81.3) patients had anemia. Similar results reported in a study by Li et al., (2005)(25) of 41,522 CKD patients identified, 49.0% had diagnosed as anemic.

Concerning the factors associated with renal failure, the majority of the patients had hypertension, followed by diabetes then, nephritis, respectively. These results nearly similar to a study done in Saudi Arabia by (26).

## Conclusions

1. Most of the patients with end-stage renal disease were above fifty of age.
2. The highest percentage of patients with end-stage kidney disease reported that they were diagnosed at private clinic, and the lowest percentage were diagnosed at primary health centers.
3. The most common associated comorbidities of renal failure are hypertension, diabetes mellitus.

## Recommendations:

1. Strategy to control hypertension and diabetes mellitus should be established at primary health care centers.
2. There is a need to increase the role of primary health care centers for early diagnosis (screening for CKD) and treatment of chronic kidney disease, early management and treatment is significant key factors for prevention of the disease.

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