



<http://doi.org/10.36582/j.Alkuno.2023.06.05>

**Al-Kunooze University College**

Journal homepage: <http://journals.kunoozu.edu.iq/1/archive> &  
[http:// www.iasj.net](http://www.iasj.net)



## **Factors Affecting Prevalence of Chronic Kidney Disease in Misan Province, Iraq**

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### **Abstract**

Chronic kidney disease is a major medical problem in Misan province causing high mortality and morbidity rate, The study sample included 53 patients from the dialysis unit of Al Sadr Hospital in Misan. About 45 % of the patients were over 55 years of age and only 21% were young (26-35 years). Women contribute to 40 % of the patients and 60 % were men. Nearly 35% of the participants were suffering from the increasing weight, with 25 % at pre-obesity grade and 36% at normal weight and only 2% underweight. The majority of the patients are earners and married. As for the educational level, most of the patients were uneducated or having only a primary school education. Nearly half of the patients were non-smokers (54 %) whereas 45% of them are smokers. Most of the males were smokers but women are mostly non-smokers. Prevalence of hypertension in Misan is the main affecting factor that is related to CKD with significant correlation reaching 95%. The prevalence of diabetes mellitus as a risk factor was high reaching (94%) of the patients. The prevalence of anaemia disease as a risk factor, was high reaching (72%) of the patients. The link between CKD patients and the cardiovascular and heredity disease was low ranging between 9 - 11%.

### **Keywords**

Prevalence , Chronic Kidney Disease, Misan-Iraq

## Introduction

Chronic kidney disease, is the gradual loss of kidney function over months or years. Symptoms of deteriorating kidney function are non-specific, and may include a general feeling of fatigue and poor appetite (Winearls and Glasscock, 2009). Often, CKD is diagnosed as a result of screening for people known to be at risk of kidney problems, such as patients with high blood pressure or diabetes and those who are related to someone with CKD (Graf et al., 2009). Chronic kidney disease may also be recognized when it leads to one of its recognized complications such as cardiovascular disease, anemia or pericarditis. Kidney damage occurs when a specific disease prevents the kidneys from functioning properly for long periods of time. The cumulative damage leads to decreased kidney performance and chronic injury (Medline Plus, 2012).

About 1 in 10 people have some degree of CKD. It can develop at any age and various conditions can lead to CKD. However, CKD becomes more common with increasing age (Luttrupp, et al., 2008). After the age of 40, kidney filtration begins to fall by approximately 1% per year (Zhou et al. 2008). In addition to the natural aging of the kidneys, many conditions that damage the kidneys are more common in older people including diabetes, high blood pressure, and heart disease. Although no valid studies clearly indicate increasing or decreasing numbers of incident paediatric patients, the prevalence of chronic kidney disease (CKD) and end-stage renal disease (ESRD) is growing worldwide. This is mainly due to improved access to renal replacement therapy (RRT), increased survival after dialysis and kidney transplantation and an increase in diagnosis and referral of these patients (Xia, 2017).

Factors affecting kidney diseases include diseases and conditions that damage the kidneys such as diabetes, hypertension, prostate gland enlargement, kidney stones, urinary bladder cancer, kidney cancer and kidney infection, rheumatic diseases and partial or complete blockage of the kidney artery (Oren et al., 1984). Chronic kidney disease (CKD) is common and can be found in up to 23% of patients with diabetes. The recommended hemoglobin A1c goal for these patients is also < 7.0%. Medication therapy for diabetes may require dose adjustments or may be contraindicated in patients with CKD. Cigarette smoking has been established as a major risk factor for CKD development in people with diabetes. Conflicting evidence exists among representative community-based studies as to whether smoking is an independent risk factor for CKD. Hypertension is found in more than 50% of pediatric patients with CKD. However, its prevalence varies according to the cause of CKD. Acquired renal disorders are associated with an increased prevalence of hypertension, similar to that of adults (Luttrupp et al., 2008). Disease (CKD). Obesity directly affects health conditions such as high blood pressure and diabetes, which can significantly contribute to chronic kidney disease. Cardiovascular disease (CVD) is prevalent in patients with chronic kidney disease (CKD) and may account for 50% of all deaths. The recent Dialysis Outcomes Quality Initiative (DOQI) publication on the evaluation, classification, and stratification of CKD states that a reduced glomerular filtration rate (GFR) identifies individuals at greater risk for CVD and death. This risk is the result of traditional and nontraditional CVD risk factors.

Although the increase in CKD prevalence is mainly caused by environmental factors, genetic factors may also influence the incidence and/or the progression of CKD and its complications (Avolio, 1995).

Genetic screening of paediatric CKD patients may enhance the impact of preventive measures that could have a positive effect on outcome. Furthermore, by identifying patient's genetic backgrounds, it is possible that a more individualised therapy could be designed (Avolio, 1995).

A part from a comprehensive study which has been done in Basrah Province by Kamel (2020) who studied the prevalence and characteristics of chronic kidney disease in Basrah City, there is a lack of research and published studies on kidney disease in Iraq and in our regions in particular. The aims of the research is to find the causes that led to kidney disease, the relationship between, age, diabetes, obesity and smoking with kidney disease and to identify the characteristics associated with Chronic kidney disease (CKD) patients in Misan Province.

## **Methods**

A cross-sectional study, included a review of (53) cases of chronic kidney disease in the dialysis centre of Al Sadr Hospital in Misan province, from January 2021 to May 2021 at the rate of 2 visits /week, the field work in this hospital finished within (30) days (4 week). The studied patients sample included 55 patients from the dialysis unit of Al Sadr Hospital, they include 32 male and 23 female

### *Data Collection*

The listed questions for questionnaire interview were chosen in a way that could assess the prevalence of Chronic kidney disease in relation to other diseases such as diabetes, hypertension, cardiovascular diseases in addition to questions about smoking status, social and educational status. All of the included patients were informed about the aim of the study and an informed consent was ensured for agreeing to participate. Data regarding patient's health were taken according to the standard Patient record system followed in the Iraqi Ministry of Health and in accordance with the consent of the patients. A face-to-face interview for each patient to find out the social situation and history of chronic kidney disease such as age, gender, and area of residence and other accompanying diseases.

The first part included background information (gender, age, place of living, job, social status, academic achievement, smoking, weight and height). Body Mass Index (BMI) was calculated by person's weight in kilograms divided by height in meters squared ( $BMI = \text{kg/m}^2$ ) according to the following formula suggested by Murguia-Romero et al. (2012) :

$$BMI = \text{Weight (kg)} / \text{Height (m)}^2$$

The second part included collected information about patient's medical history (Hypertension, Diabetes, Cardiovascular, Anaemia, other diseases, heredity diseases and Cancer).

### *Statistical Analysis*

The collected data were analysed using Office Excel 2019 and SPSS-23. Variables were analysed by using frequencies, proportions, percentages and rates.

## **Results**

### *Role of Age and Gender*

Data of Table (1) shows age and gender distribution of the CKD patients sample of this study. It consists of 54 patient, 23 of them are females and 31 males. The majority were between age of 56-65 years contributing to 27.2% followed by the most young group of 26-35 years which

contribute 21.8%. Patients between 36-45 and 46-55 contribute to 16.3% and 14.5% years respectively. Old patients who are more than 66 years contribute 16.3%. The sample include also one female of more than 76 years old. As for the interaction between age and gender, it can be seen that male patients are mostly between 56-75 years, while most female patients are between 36-65 years. This means that men may develop CKD in older ages than women. Not only old people are susceptible to CKD, but also young males and females are also vulnerable to CKD at young ages (26-35 years).

**Table 1- Distribution of patients with CKD according to age and gender**

| Age group | Males |       | Females |       | Total |       |
|-----------|-------|-------|---------|-------|-------|-------|
|           | N     | %     | N       | %     | N     | %     |
| 26-35     | 8     | 14.5% | 4       | 7.2%  | 12    | 21.8% |
| 36-45     | 3     | 5.4%  | 6       | 10.9% | 9     | 16.3% |
| 46-55     | 3     | 5.4%  | 5       | 9%    | 8     | 14.5% |
| 56-65     | 9     | 16.3% | 6       | 10.9% | 15    | 27.2% |
| 66-75     | 8     | 14.5% | 1       | 1.8%  | 9     | 16.3% |
| 76-85     | 0     | 0%    | 1       | 1.8%  | 1     | 1.8%  |

#### Role of Obesity

It can be seen from the data of Table (2) that about 60% of the sampled population was within normal weight and 35% of them are at various degree of obesity. These results indicate that the majority of the study participants were not suffering from the increasing weight.

**Table 2- Distribution results of patients with CKD on dialysis according to body mass index (BMI)**

| Class             | BMI       | %     |
|-------------------|-----------|-------|
| Underweight       | < 18.5    | 1.8   |
| Normal weight     | 18.5-24.9 | 36.53 |
| Pre-obesity       | 25.0-29.9 | 25.45 |
| Obesity class I   | 30.0-34.9 | 14.54 |
| Obesity class II  | 35.0-39.9 | 11.00 |
| Obesity class III | > 40.0    | 10.70 |

#### Role of Demographic Status

Data of Table (3) showed that 43.6% of CKD patients in Misan came from areas near the city centre and about 56.4% from the peripheral country side. This might

be explained on the basis of availability of health care in the province. It seemed that people living near the city centre may have better services and better health care than people living in the country side.

Table 3- Percentages of CKD patient's according to demographic status in Misan

| Residential area       | Numbers | %      |
|------------------------|---------|--------|
| City center            | 24      | 43.64% |
| Peripheral countryside | 31      | 56.36% |

#### *Role of Marital Status*

As seen from the below diagram in Fig. (1), 100 % of the female patients were married and 85% of the patients males are married. While only 10 % of the male patients are unmarried and only 5% of them are divorced. These results agreed with previous studies conducted on dialysis patients in other provinces in Iraq.

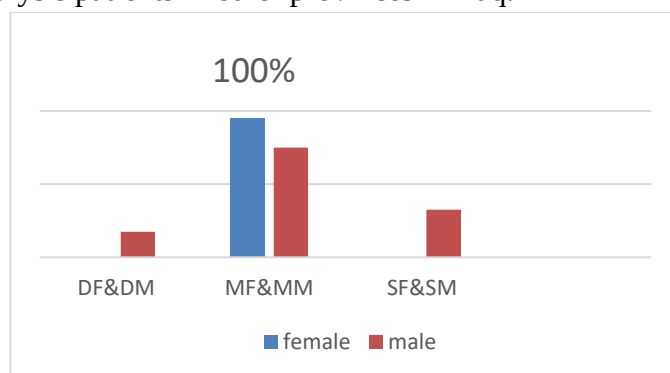


Fig. 1- Percentages of CKD patient's distributed according to marital status

D.F: Divorced female, D.M: Divorced male, M.F: Married female, M.M: Married male S.F: Single female, S.M: Single male.

#### *Role of Educational level*

It is clear from Fig. (2) that the majority of our CKD patients in Misan province are uneducated people (60%) and about 15% having primary education only. While the percentage of the educated people having secondary school education or higher degree is low (<10%). This agree with previous investigations in the area with a percentage of (74.9%).

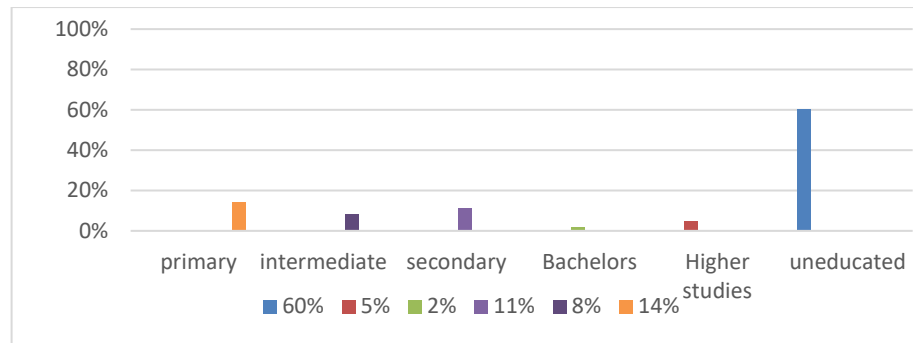


Figure 2: Percentages of CKD patient's according to their educational level

#### Role of Smoking

Role of smoking on CKD patients in Misan is pointed out in Table (4). It can be seen that most of the patients males are smokers (43.6%), compare with only 14.5% non-smokers. On contrary, nearly all the female patients are non-smokers except one female. Therefore, on total basis, 45% of the patients are smokers and 54% of them are non-smokers.

Table 4- Percentages of CK patient's according to smoking status and gender

| Smoking | Female | Male   | Total  |
|---------|--------|--------|--------|
| Yes     | 1      | 24     | 25     |
| %       | 1.8%   | 43.6%  | 45.4%  |
| No      | 22     | 8      | 30     |
| %       | 40%    | 14.54% | 54.54% |

#### Role of Risk Factor Diseases

Data of Table (5) shows the previous history of other risk factors diseases in our CKD patients sample which are closely correlated with CKD. The most pronounce diseases were Hypertension and Diabetes mellitus as 94% of the CKD patients were also Diabetic and Hypertension patients. The third disease was the Anaemia (72.7%). Cardiovascular and Heredity diseases contribute to only 10%. There was other diseases reported by the patients but are not risk factor diseases for CKD (51%).

Table 5- Frequency and percentage of CKD patients suffering from risk diseases

| Disease                | Yes | %      | No | %      |
|------------------------|-----|--------|----|--------|
| Hypertension           | 52  | 94.54% | 3  | 5.45%  |
| Diabetes mellitus      | 52  | 94.54% | 3  | 5.45%  |
| Cardiovascular disease | 5   | 9.0 %  | 50 | 91.0%  |
| Anaemia                | 40  | 72.7 % | 15 | 27.3%  |
| Cancer                 | 0   | 0.0 %  | 55 | 100.0% |

|                |    |        |    |       |
|----------------|----|--------|----|-------|
| Heredity       | 6  | 10.9 % | 49 | 89.1% |
| Other diseases | 28 | 50.9 % | 27 | 49.1% |

### Hypertension

A significant relationship between patients with hypertension and CKD ( $P < 0.05$ ). According to the previous history of the disease among the sampled population, the present study found that 52 (94.5%) of CKD patients had hypertension, 23 (41.8%) were males, 29 (52.7%) were females (Table, 6). The relationship between CKD and hypertension was high  $r^2 = 0.9635$  ( $P < 0.05$ ).

Table 6- Percentages of CKD patients with hypertension disease

| Total | Female | Male  | Hypertension |
|-------|--------|-------|--------------|
| 52    | 29     | 23    | Yes          |
| 94.5% | 52.7%  | 41.8% | %            |
| 3     | 0      | 3     | No           |
| 5.5%  | 0%     | 5.5%  | %            |

### Diabetes mellitus

Previous history of our CKD patients in Misan province shows that 94.5 % of them had Diabetes mellitus also. A total of 54.5% of them were males and 40% female patients (Table 7). Out of 52 patients only one female and three males are not diabetic patients. The correlation between CKD and previous Diabetes mellitus was significant ( $r^2 = 0.9359$  and  $P < 0.05$ ).

Table 7- Percentages of CKD patients with Diabetes mellitus disease

| Total | Female | Male   | Diabetes mellitus |
|-------|--------|--------|-------------------|
| 52    | 22     | 30     | Yes               |
| 94.5% | 40%    | 54.54% | %                 |
| 3     | 1      | 2      | No                |
| 5.46% | 1.8%   | 3.6%   | %                 |

### Cardiovascular Disease

Table (8) shows the relationship between CKD and previous cardiovascular diseases. The relationship between cardiovascular diseases and CKD was weak and not significant ( $p > 0.05$ ) as only 9 % of the samples patients were suffering from previous cardiovascular problems. 5.4 % of them were male and 3.6% were females.

Table 8- Percentages of CKD patients with heart disease

| Total | Female | Male  | Heart disease |
|-------|--------|-------|---------------|
| 5     | 2      | 3     | Yes           |
| 9%    | 3.6%   | 5.4%  | %             |
| 50    | 21     | 29    | No            |
| 91%   | 38.2%  | 52.8% | %             |

#### *Anaemia*

High correlation was found between the CKD patients and previous Anaemia cases ( $r^2 = 0.8574$  and  $p < 0.05$ ). around 73% of the patients were suffering from Anaemia. It was nearly similar in males (38%) and females (34.5%) (Table, 9).

Table 9- Percentages of CKD patients Anaemia

| Total  | Female | Male   | Anemia |
|--------|--------|--------|--------|
| 40     | 19     | 21     | Yes    |
| 72.73% | 34.54% | 38.19% | %      |
| 15     | 4      | 11     | No     |
| 27.27% | 7.27%  | 20%    | %      |

#### *Heredity Diseases*

Only 10.8% of CKD patients in Maysan had a previous genetic or heredity diseases, so that the correlation was weak. Female patients had higher percentage (7.3%) than males (3.6%) (Table, 10).

Table 10- Percentages of CKD patients with genetic diseases

| Total  | Female | Male   | Genetic Diseases |
|--------|--------|--------|------------------|
| 6      | 4      | 2      | Yes              |
| 10.87% | 7.27%  | 3.6%   | %                |
| 49     | 19     | 30     | No               |
| 89.08% | 34.54% | 54.54% | %                |

#### *Other Diseases*

Among other diseases only kidney stones was recorded as a risk factor. About 5.5% of the CKD patients sampled in this study were suffering from a previous kidney stone disease so that the relationship was weak and not significant ( $p > 0.05$ ).





<http://doi.org/10.36582/j.Alkuno.2023.06.05>

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## Discussion

Findings of the present study showed that old age groups are the most vulnerable to CKD as stated by Grundy (1999) and Samani & Harst (2008). Jha et al. (2013) showed that CKD dramatically increases with aging, particularly, after the age of 50 in both genders and males develop CKD more than females (Tauchi et al., 1971). Virmani, et al (1991) pointed out the effect of aging on aortic morphology in populations with high and low prevalence of hypertension and atherosclerosis. The present results also revealed that CKD cases in Misan are also related to infection by other diseases especially heart and arteries diseases (Grundy, 1999) and kidney stones (Oren et al. 1984). The results also showed that men may develop CKD in older ages than women. This could be related to the theory of Biological ages which was considered by Bulpitt et al. (1994). In Iraq, Alaugili *et al.* (2015) in the southern provinces, Awad (2011) in Diyala Province and Kamel (2020) in Basrah province all showed similar observations to the present findings in Misan Province.

The study also showed that the prevalence of CKD among overweight and obesity people was only 35 %. This agrees with another study conducted in Iran and showed a percentage of 37.1% (Sepanlou et al., 2017), while Kamel (2020) stated that the majority of the participants in his study were suffering from increasing weight in Basrah Province. As for the role of smoking status, it can be seen that most of the patients males are smokers (43.6%), compare with only 14.5% non smokers. The present findings are similar to those reported by Kamel (2020). Smoking promotes the development of kidney fibrosis, leading to a faster decline of kidney function (Van DeVoorde & Mitsnefes, 2011; Van Laecke et al., 2017).

Most of the CKD patients who suffered from hypertension are old in age, because of the effect of aging on hemodynamic as stated by Franklin et al. (1997). Kamel had reported a prevalence value of hypertension of 75.8% in Basrah, which is much more than that reported in other countries (23%-50%) (Al-Ramly et al., 2013 in Jorden; Suliman et al., 2016 in Qatar). Previous history of our CKD patients in Misan province shows that 94.5 % of them had Diabetes mellitus also. This result is much more higher than that recorded by Kamel (2020) in Basrah province (37.7%) and that reported in Macedonia (13.9%) (Stojceva-Taneva, et al., 2016). As for cardiovascular disease, only 9 % of the samples patients were suffering from previous cardiovascular problems. This percentage, however, is higher than that reported by Kamel (2020) in Basrah (3.66%) but lower than that reported in Egypt (14.5%) by Al-Sabbah et al., (2019). The 73%

value of CKD patients suffering from anaemia is much higher than that of Kamel (2020) in Basra (3.6%) and that found by Stauffer and Fan (2014) in the United States.

### **Acknowledgments**

The funding of this research by Al-Manara College for Medical Sciences is highly appreciated. Thanks are due to the reviewer of the manuscript and the editor for their assistance.

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