Clinical Characteristics and Risk Factors of Chronic Kidney Disease Among Patients Undergoing Hemodialysis

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Abstract

Background: *Chronic kidney disease (CKD) is common and serious, yet recognition and limited responses public health. It is one of the leading causes of mortality worldwide and is increasingly recognized as a global public healthcare challenge, especially in developing countries. Many people don't know they have the renal disease because up to 90% of renal function can be lost asymptomatic.*

Study Objective: *To describe clinical features and risk factors for developing chronic kidney disease among patients treated in Al-Sadder Medical Hospital in Al-Najaf City.*

Methodology: *A descriptive design (cross-sectional) study was conducted on parsons selected from the Dialysis Kidney Unit at Al-Sadder Medical Hospital in Al-Najaf City to achieve the study's aim. The study was conducted in Al-Najaf province / Al-Najaf Health Directorate /Al-Sadder Medical Hospital. A Non- Probability (Accidental Sample) technique was used consisting of (128) patients with chronic kidney disease, which are included in the present study. The data were collected using a questionnaire consisting of three parts, including socio-demographic, clinical data form, and risk factors of CKD form.*

Results: *Diabetes mellitus (DM) has a (71.9%) risk and has a significant role in CKD development. Hypertension (HT) had (62.5%). Cardiovascular disease (CVD) had (53.1%) risk for CKD and has more than one CVD type such as ischemic heart disease, heart failure. Family history of renal diseases had (62.5) times risk for CKD.*

Conclusion: *Many risk factors play a major role in contributing to the progress and development of chronic kidney disease in Al-Najaf City, especially diabetes mellitus, hypertension, cardiovascular disease, family history of kidney disease, family history of chronic diseases.*

Keywords: Risk Factors, Chronic Kidney Disease, Clinical Characteristics

Introduction

Since common chronic diseases such as cardiovascular disease, renal failure, diabetes, high cholesterol, and thyroid diseases are widespread in Iraqi societies, it is necessary to reveal their causes [1]. Chronic kidney disease is one of the chronic conditions, and it's referred to as an umbrella term that describes a decrease in the glomerular filtration rate (GFR) or kidney damage lasting for three or more months. In addition, CKD worldwide is rising markedly, becoming a significant public health problem associated with poor quality of life and self-management [2]. Several chronic diseases result from a shortlist of risky behaviors such as smoking and tobacco use, poor nutrition that includes diets low in vegetables and fruits and saturated fats and high in sodium, excessive alcohol take, and lack of physical activity [3]. Chronic kidney disease can make major life changes. It can affect general health, threaten comfort, and disrupt daily routine with diverse physical symptoms such as fatigue, nausea, vomiting, loss of appetite, constipation, difficulty sleeping, and pain [4].

Five important risk factors of CKD include; diabetes mellitus, hypertension, high salt intake, physical inactivity, and smoking. In addition, family history of renal disease, advanced age (over 60 years), cardiovascular disease, obesity, race or ethnicity, and other causes such as autoimmune diseases, polycystic kidney disease. Unfortunately, only a small number of studies have investigated the effect of these and another way of lifestyle measures on renal outcomes [5]. A systematic review described the effects of salt reduction on both proteinuria and hypertension in CKD people [6]. In contrast, another review covered and reported the association between renal function and smoking cessation. There is a need for these types of studies to use hard kidney outcomes, such as the start of renal replacement therapy (RRT) [7].
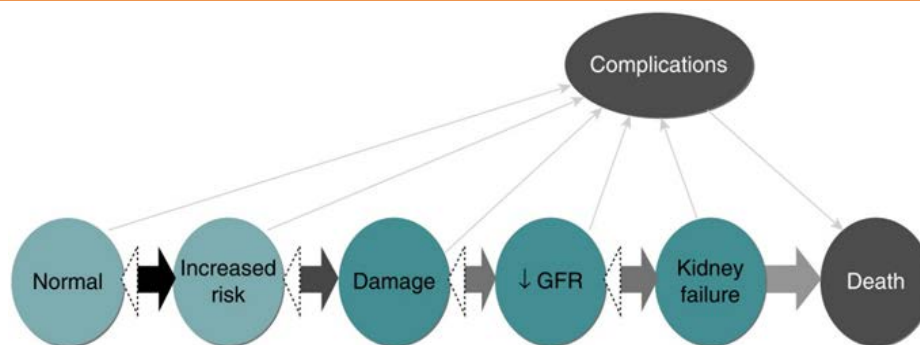
Figure 1: Conceptual model of renal decline (Levey et al., 2015)

The prevention of risk factors for CKD may prevent or delay the development of CKD and its complications of note; lowering one risk factor for CKD may also affect the other risk factors for CKD [8]. The International Society of Nephrology [ISN] (2020) Reported that exceeds over 850 million people worldwide are now estimated to have some form of CKD, acute kidney injury (AKI), and those on RRT. The prevalence of CKD worldwide is 10.4% among men and 11.8% among women [9]. In Iraq, and according to the annual statistic report of the Ministry of Health/ environment (MOH) statistics, the percentage of chronic kidney disease in the year 2015 was (5.71 %) (Iraq Ministry of Health, 2015) [10]. Statistics in 2018, kidney failure, is the top ten causes of death in Iraq, and it ranked 5th cause, with a percentage of 6.06% (Iraq Ministry of Health/environment, 2018) [11]. In Al-Najaf City, Al-Sadder Medical city, the number of all cases of patients suffer chronic kidney disease in 2018 was 2206 cases. In 2019 were 3441 cases [12].

Figure 2: Pathogenesis of chronic kidney disease

The risk factors for the development of chronic kidney disease are divided into non-modifiable and modifiable factors. Non-modifiable factors: advanced age, gender, ethnicity or race (non-Caucasian), genetics such as polycystic kidney disease, family history of kidney disease, or chronic disease. Modifiable factors: smoking, metabolic syndrome or obesity, residence,

and low socioeconomic status, hypertension, diabetes mellitus, dyslipidemia, cardiovascular disease, nephrotoxic agents: analgesics, NSAIDS, ACEI, aminoglycosides, autoimmune disease: vasculitis, previous of acute kidney injury, proteinuria.
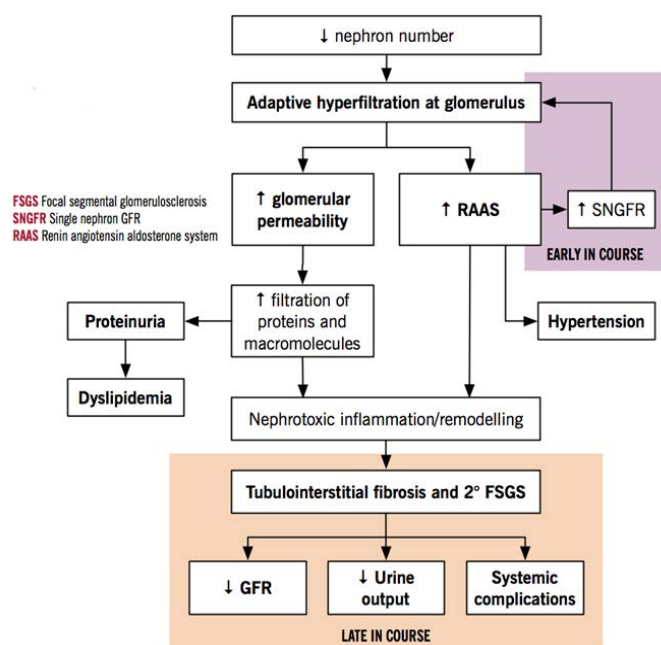

Figure 3: chart showing stages of CKD how progressive based on estimated GFR.

Study objective: The present study aimed to describe clinical features and prevalence and evaluate the major risk factors contributing to chronic kidney disease progression and development among patients treated in Al-Sadder Medical Hospital in Al-Najaf City.

Methodology

Design of study: A Descriptive design (cross-sectional) study was used through the current study to describe clinical features and major risk factors for the development of chronic kidney disease among patients treated in Al-Sadder Medical Hospital in Al-Najaf City during a period of the study is from 20th December 2020 to 28th February 2021.

Study setting: The study was conducted in Al-Najaf City / Al-Najaf Health Directorate /Al-Sadder Medical Hospital (specialized center for kidney transplantation and nephrology disease).

Study Sample: A Non- Probability (Accidental Sample) technique was used consisting of (128) patients with chronic kidney disease are selected. Those patients who are already diagnosed with chronic kidney disease and had already used the medication and visited the hospital for follow-up or treatment or both are included in the present study. The sample of the study was selected from medical word and medical consultations.

Study Instrument: The researcher adopted an assessment tool based on the previous literature to assess clinical features, prevalence, and significant risk factors for CKD development. The final study instrument consists of three parts: Part I: Socio-demographic Data of Patients, Part II: Clinical Data of Patients, Part III: Risk factors of chronic kidney disease.

"This questionnaire information was gathered from multiple recent resources, including comprehensive clinical nephrology, Harrison nephrology, and recent researches about CKD".

Data collection and procedure: The data had been collected through the use of the developed questionnaire and through a structured interview technique with the subjects who were individually interviewed. They were interviewed similarly, by the same questionnaire for all those subjects included in the present study. The primary source of data was obtained directly from the patients by the investigator through interviews with the patients, from their case sheets. Each subject spends approximately (10-15) minutes to complete the interview.

Data Analysis: In order to achieve the study objective, the data were entered into Excel 2019 worksheet and statistically analyzed by using SPSS (statistical package of social sciences) version 23 through statistical analyses such as (percentage, frequency, and mean of scores).

"This study was conducted according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for cross-sectional studies".

Results of the study

Table 1: Summary Statistics of The Study sample Socio-Demographic Data

Variables	Rating and Intervals	Frequency	Percentage
Age (year)	20 - 29	8	6.3
	30 - 39	8	6.3
	40 - 49	36	28.1
	50 - 59	44	34.4
	60+ and more	32	25.0
	$\bar{x} \pm$ S.D.	51.93 $\pm$ 11.70	
Gender	Male	88	68.7
	Female	40	31.3
Education Level	Doesn't read and write	16	12.5
	Read and write	44	34.4
	Primary school graduated	36	28.1
	Intermediate school graduated	16	12.5
	Secondary school graduated	8	6.3
	Institutes, college, or postgraduate	8	6.3
Occupation Status	Governmental employed	16	12.5
	Own worker or self-employed	8	6.3
	Retired	8	6.3
	Housewife	36	28.1
	Jobless	44	34.4
	Disable	16	12.5
Monthly Income	Insufficient (Low)	84	65.6
	Sufficient to some extent (Moderate)	40	31.3
	Sufficient (High)	4	3.1
Total		**128**	**100.0**
$\bar{x}$: Mean; S.D: Standard deviation			

Socio-demographic Characteristics in Adults with CKD and at Risk of CKD

Table (1) indicate the statistical distribution of the participants according to their socio-demographic data; and the result of the study indicates that most of the study participants, 50-59 years old (34.4%), male (68.8%), read and write (34.4%), those with jobless (34.4%) and their income are insufficient (65.6%).

Table 2: Statistics Distribution of Study Sample According to Clinical Characteristic

Clinical Characteristic	Rating and interval	Frequency	Percentage
Duration of Renal Failure (Years)	less than or 1	12	9.4
	2 – 3	52	40.6
	4 - 5	40	31.3
	6 or more	24	18.8
Renal Stone	Yes	96	75.0
	No	32	25.0
Family history of renal disease	Yes	80	62.5
	No	48	37.5
Smoking Habit	Smoker	20	15.6
	Ex-smoker	56	43.8
	Non-smoker	52	40.6
Body Mass Index kg/m^2	Underweight	12	9.4
	Normal weight	55	42.9
	Overweight	51	39.8
	Obesity	10	7.9
Total		128	100.0

Clinical Characteristics in Adults and at Risk for CKD

Table (2) Shows the statistical distribution according to their clinical Characteristic; the study result indicates that the majority of the study participants with the duration of disease between 2 - 3 years (40.6%); have renal stone (75.0%) and have a family history of renal disease (62.5); Ex-smoker and most of those in normal body weight (42.9).

Table 3: Statistical Distribution of patients according to diabetes mellitus

Variable	Rating and interval	Frequency	Percentage
Diabetic Mellitus	Yes	92	71.9
	No	36	28.1
Duration of Diabetic Mellitus	Less than 5 years	14	15.2
	5-10 years	38	41.3
	More than 10 years	40	43.5
Total		128	100.0

Table (3) shows that the study result indicates that most patients with diabetes mellitus (71.9%) have a risk for developing CKD and that more than 10 years (43.5%).
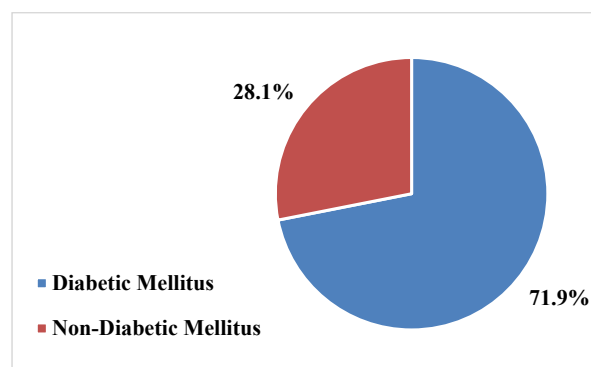

Figure 4: Distribution of patients according to diabetes mellitus

Table 4: Statistical Distribution of patients according to hypertensions

Variable	Rating and interval	Frequency	Percentage
Hypertension	Yes	80	62.5
	No	48	37.5
Duration of Hypertension	Less than 5 years	18	22.5
	5-10 years	24	30
	More than 10 years	38	47.5
Total		**128**	**100.0**

Table (4) shows that the study result indicates the most patients with hypertension (62.5%) has a risk for developing CKD and that more than 10 years (47.5%).
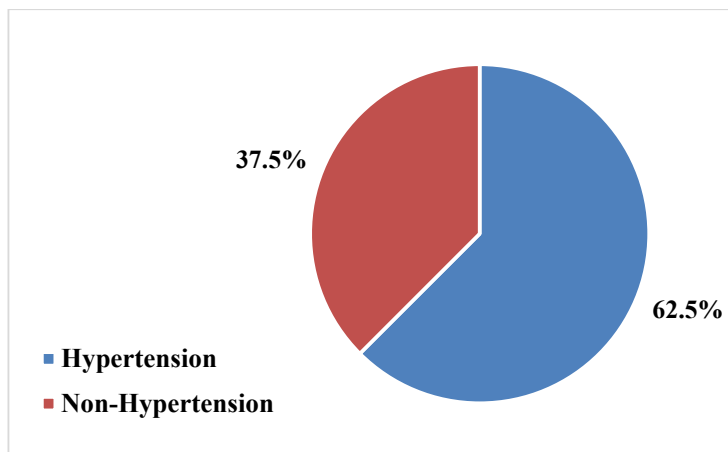

Figure 5: Distribution of patients according to hypertension

Table 5 : Statistical Distribution of patients according to cardiovascular disease

Variable	Rating and interval	Frequency	Percentage
Cardiovascular Disease	Yes	68	53.1
	No	60	46.9
Types of cardiovascular disease	IHD	16	23.5
	HF	15	22.1
	More one type	37	54.4
Total		**128**	**100.0**

Table (5) shows that the study result indicates that most patients with cardiovascular disease (53.1%) have a risk of developing CKD and that have more than one type of cardiovascular disease (54.4%).
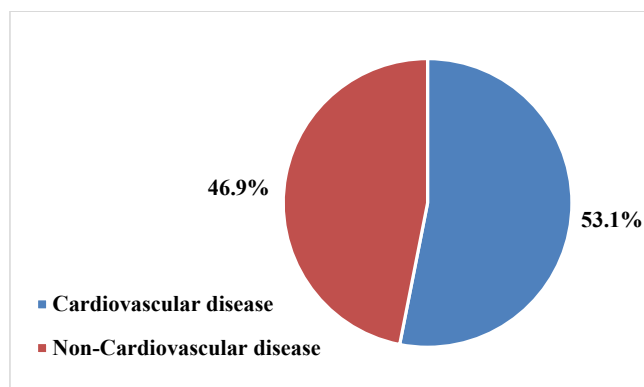

Figure 6: Distribution of patients according to cardiovascular disease

Discussion

Chronic renal disease (CRD) is emerging as a major health problem in developing countries. It is a condition affecting millions of people in various countries, and its occurrence is affected by demographic data from the patient.

Socio-demographic Characteristics Related to Patients with CKD: The present study's findings indicate that most study participants are of advanced age. This authenticates that the incidence of chronic kidney disease increases as the individuals' age increases and vice versa.

Alkhaqani and Ali (2021) [13]; they indicated that patients within age 50 years old and older are the dominant age group with CKD [14]. In addition, Al-Nassar and AL-Bayati, (2017) they have studied the "assessment of patients' self-care and self-efficacy after end-stage renal disease undergoing hemodialysis in Al-Najaf city" and they found that the majority of the patients are with advanced age (50 years old and more) [15].

According to recent estimates by Johns Hopkins University, researchers found that kidney disease is more prevalent in people over the age of 60 compared to the rest of the general population (NKF, 2020) [16]. The prevalence of chronic kidney disease increases markedly with old age. The reason for this because the patients with advanced age may suffer from systemic and chronic diseases, stress, and an increasing rate of catabolism. Moreover, elderly patients suffer from a decrease in the glomerular filtration rate (GFR) due to diseases that complicate ageing, such as atherosclerosis and high blood pressure. In addition, there is an increase in catabolism rates and a decrease in metabolism rates, which makes the elderly vulnerable to many chronic diseases and health problems [17,18].

The present study also describes gender. The findings indicate that the male is the dominant gender. Fradelos, (2020); Bayoumi and Wakeel, (2015) they indicated that the majority of the study sample were are males [19]. In addition, gender differences in the broad spectrum of health and disease have been the subject of extensive investigation and are currently receiving greater attention in nursing. The acting of sex hormone, naturality of occupational, stress exhibiting, and chronic disease distribution all of these factors make the male more vulnerable to CKD than females. Also, differences in lifestyle, such as smoking cigarettes and consuming alcohol, may help explain this gender gap [20].

Concerning the level of education, the study reveals that the highest percentage of the study sample can read and write. Al-Abedi et al., (2020); studied the "Assessment self-care of patients' undergoing hemodialysis with end-stage renal disease" and Baqer et al., (2018), studied the "Impact of end-stage renal disease upon physical activity for adult patients undergoing hemodialysis at Al-Najaf governorate hospitals" they found in their results that the majority of the study samples were able to read and write only21. This may be because most of the study subjects are old age, and their living and social and cultural conditions did not allow them to join school or complete their study. In addition, that result may come due to continued economic and political crises and wars that our country has suffered from since the beginning of the eighties until this time.

Regarding occupational status, more than one-third of the study participants were jobless. These results are similar to other studies done in Iraq by Hosny et al., (2017), the study entitled "assessment of the quality of life for hemodialysis patients in Iraq" and another study by Baqer et al., (2018) they explain that the results show that most of the study sample were had lost their work22. This result may come because more than one-third of the study participants are within an advanced age because they can't work compared to younger patients. And maybe because of the disease effect and its treatment on patient lifestyle and daily routine. However, a previous study has reported that patients with CRF are forced to take either lower-paid job or lose their jobs, resulting in reduced income and lower QoL [21].

The study also indicates that most of the study sample have an insufficient monthly income. Anees et al., (2014), they mentioned in their results that most of the study participants had insufficient monthly income. The reason for this result because people

live with the Coronavirus epidemic, which imposed a quarantine on them in their homes, which led to the loss of their jobs and thus reduced monthly income; i.e., they are unable to reach their personal needs, and their family needs such as the needs associated with their diseases. Buying medicines and a special diet for dialysis patients is one of the reasons for the weak economic situation, and other factors share it because they are older and cannot work.

Clinical Characteristics Related to Patients with CKD: According to the duration of disuses, the result of the current study reveals that the highest percentage of the study participants had the experience of CKD, between two to three years. This result is in the same line with Al-Abedi et al., (2020), they stated in their study that most of the study subjects, about (93.3%) had an experience of CKD less than or equal to three years [22]. The researcher believes that people in the last two years have suffered from unhealthy social lifestyle problems and financial difficulties that may contribute to an increase of cases in these years. In addition, the study results show that most of the study sample were diagnosed with renal failure for since two years or more. Al-Nassar et al.,(2017), they found that most of the study patients diagnosed with chronic renal failure were less or equal to three years [15].

Moreover, the study results indicated that the majority of the patients (43.8%) were previously smokers, but more than a third of them about (40.6%) were non-smokers. This result agrees with Hirst et al. (2020) [16]; they reveal that most of the patients were non-smokers. Additionally, the study results show that the majority of the sample has a normal weight. This finding agrees with the study of Barbosa et al. (2017) [23]; Zyoud et el., (2016) [24]; they indicated that the patients presented within normal body mass index. But disagree with the study done in Oman by Lazarus (2018) entitled "effectiveness of education and exercise on quality of life among patients undergoing hemodialysis" their results indicate that the body mass index is underweight [25].

The difference in patients' body mass index between countries may be due to the change in lifestyle and adherence to the therapeutic regimen. Furthermore, patients with CKD exhibit several nutritional problems; most of them have malnutrition (less than body requirement), making the increase in body mass index rarely occurs. In addition, the researcher believes that it needs more time to measure the change in body mass index, so no changes were observed during the study period [26,27].

According to the risk factors of chronic kidney diseases, the study findings indicate that most of the patients have diabetic mellitus. This result is consistent with such study findings by Shiferaw et al., (2020) entitled "chronic kidney disease among diabetes patients: a systematic review and meta-analysis, " revealing that diabetic mellitus is the most frequent common cause of chronic renal failure. In addition, Chen et al., (2020); Copur et al., (2020) they indicated that diabetic mellitus continues to be the leading cause of CKD in the U.S and most countries. This is because diabetes damages the small blood vessels in the kidneys; this can damage the kidneys and cause increased blood pressure [28,29].

Regarding hypertension (HTN) among patients with CKD, the results presented that many study participants have hypertension. Khaleel et al., (2019), they study "risk factors of chronic kidney disease among patients attending Ibn Sina teaching hospital in Mosul city" and concluded that diabetic mellitus and hypertension play a major role in the development and progress of CKD. Because uncontrolled hypertension can cause the arteries around the renal to narrow or harden, leading to damage. The aetiology of primary kidney disease is worth noting that the two major causes were diabetic mellitus followed by hypertension [30]. Hypertension is high in patients with CKD receiving hemodialysis, and it is an established risk factor for cardiovascular disease morbidity and mortality. Hypertension is both a cause and effect of CKD and contributes to its progression [31].

Concerning cardiovascular disease (CVD), the study results indicate that more than half of the participants suffer from CVD, in addition to other chronic illnesses, the results of the study show that many chronic diseases are comorbid to patients with CKD, such as angina, arthritis, bladder cancer, nephrotic syndrome, and gallstone. Kazancioğlu, (2013) he mentioned in his study entitled "Risk factors for chronic kidney disease: an update" that there are many factors associated with chronic renal diseases such as acute kidney injury, a history of cardiovascular disease, metabolic syndrome, smoking, malignancy, and the use of analgesic medications [32].

Conclusion: The study concluded that several major risk factors are contributing and play a significant role in the progression and development of chronic kidney disease in Al-Najaf, especially diabetes mellitus, hypertension, cardiovascular disease, family history of kidney disease, family history of chronic diseases, and also the study it has been concluded that the disease most commonly occurs in advanced age patients and male more than in females.

Recommendation
The researcher recommends comprehensive wide population-based studies could be conducted to assess the major risk factors for the development of chronic kidney disease among adult patients

Ethical consideration
The researcher obtained an official legal, governmental agreement from the Ministry of Health/Environment and the Directorate of Health in Al-Najaf and Al-Sadder Medical Hospital before conducting the current study. Taken verbal consent from all the participants included in the present study; the study's objective is explained clearly to the participants, and the participation was voluntary.

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Conflicts of interest
The author declares no conflict of interest to declare for publication

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