How to Cite:
Sabri, N. W., Rashid, B. A., & Alsodani, M. H. (2022). Risk factors of chronic kidney disease. *International Journal of Health Sciences*, *6*(S8), 1996–2004.
https://doi.org/10.53730/ijhs.v6nS8.12381

Risk factors of chronic kidney disease

Nabaa Wisam Sabri
College of health and Medical Techniques/Baghdad, Middle Technical University
Corresponding author email: nabaawisam94@gmail.com

Buthaina Ateyah Rashid
Asstistant proffessor, Department of Community health, College of health and Medical Techniques/Baghdad, Middle Technical University, Baghdad, Iraq

Mohammed Hannon Alsodani
Asstistant professor, Nephrology department, College of Medicine,Baghdad University

***Abstract*---**Chronic kidney disease is characterized by structural abnormalities or progressive or permanent loss of renal function for three months or more and is often accompanied by a glomerular filtration rate of less than 60 mL/min/1.73 m2. The objective of the study is to assess the risk factors contributing to chronic kidney disease among the patients between cases and controls in the Medical City Complex and to predict variables that contribute to the risk factors of chronic kidney disease among the studied samples. The study, a case-control design, has been carried out in Baghdad's Medical City Complex. Information was gathered for a full five months, included in the sample of 300 (150 cases and 150 controls). The result was The likelihood of developing chronic kidney disease was highly correlated with a history of hypertension, acute kidney disease, renal stones, and anemia. Also, both open kidney surgery and extracorporeal shock wave lithotripsy decrease kidney function and make it more likely that you will get chronic kidney disease.

***Keywords*---**chronic kidney disease, risk factors, kidney failure, end stage renal disease, glomerular filtration rate.

Introduction

Kidney diseases have risen from the world's 13th leading cause of death to the 10th, and mortality has increased from 813,000 in 2000 to 1.3 million in 2019, so its epidemiology, risk factors, treatment approaches, and preventive measures have attracted worldwide attention(Singh et al., 2021). End-stage renal disease (ESRD), or kidney failure that is irreversible or fatal unless treated by dialysis or a

Manuscript submitted: 9 May 2022, Manuscript revised: 18 July 2022, Accepted for publication: 27 August 2022

kidney transplant, is the result of chronic kidney disease, which is characterized by structural abnormalities or progressive or permanent loss of renal function for three months or more and is often accompanied by a GFR of less than 60 mL/min/1.73 m^2 (Sultana et al., 2020).

Since some risk factors can be changed to stop or slow the progression of end-stage renal disease (ESRD), which is also a major risk factor for heart disease, community health professionals need to find out what makes a person more likely to get chronic kidney disease (Bikbov et al., 2020). Because kidney disease is asymptotic in its early stages (1-3a), it is difficult to assess and detect the disease in its early stages. When the patient has lost more than half of their kidney function or progressed to ESRD, the symptoms will appear, and the patient will seek medical treatment. However, kidney disease is a silent killer. Chronic kidney disease can be less expensive if people who are more likely to get it are treated early and identified(Kore, 2018). Common causes of chronic kidney disease (CKD) include high blood pressure, diabetes, and obesity (Nalado et al., 2012). This research aim to assess the risk factors contributing to chronic kidney disease among the patients between cases and controls in the Medical City Complex and to predict variables that contribute to the risk factors of CKD among the studied samples.

Materials and Methods

The study, a case-control design, has been carried out in Baghdad's Medical City Complex. Information was gathered for a full five months, from December 7, 2021, to May 5, 2022. All patients who were diagnosed with CKD by a specialist were included in the sample of 300 (150 cases and 150 controls) drawn at random from a larger population (a nonrandom sampling approach).

They used the following a formula to determine the minimal size of a sample: $n=p*(1-p)*z^2/d^2$

n: minimal sample size
P: proportion of Prevalence of CKD in the population was 6.8%, according to a previous study done by (Kamil et al., 2021)
Z: confidence level (z = 1.96 at 95%)
D: This is the acceptable margin of error (0.05^2)
$n= *(1-6.8\%) *1.96^2/0.05^2$
n = 97 cases are the least sample size necessary to carried out this study. But the actual number of cases in this study was 150.

As a first step, ten (10) patients with "Chronic Kidney Disease-CKD" at the "Medical City Complex" in Baghdad City were randomly selected for a pilot study to determine the most effective method for determining the nature of the challenges these patients would face. This exploratory research covered the time frame of December 1, 2021, until December 7, 2021.

Statistical Analysis

The data through the questionnaire and information of each questionnaire's results were first entered into an Excel spreadsheet for encoding and then imported into SPSS-22.0. Calculate frequencies, percentages, means, standard deviations, and ranges from the collected data (minimum and maximum values). The Contingency Coefficients (C.C.) test and the binomial test were used to analyze the statistical significance of the gap between the various percentages (qualitative data). If the P-value was less than or equal to 0.05 and the odd ratio was greater than 1, then the result was considered statistically significant, indicators of a higher likelihood of developing chronic kidney disease.

Results and Discussions

The current study included 300 people ranging in age from 15 to >70 years old who were drawn at random from two communities. The first group included 150 patients with CKD (case study group) with an average age of (47.71 ± 17.42) years, and the second group included 150 people who did not have CKD (control group) with an average age of (48.54 ±17.43) years.

Medical History

Distribution of Medical History according to having a diagnosed disease with comparisons significant. Table (1) shows the distribution of asking about the medical history items, such as Diabetes, Hypertension, Acute kidney disease, Renal Stone, Anemia, Prostatic hyperplasia and asking for family history of renal disease are illustrated to be sure that two independent groups are thrown from the same population or not in light of those variables, and to explore the factors that register an initial difference in light of distribution groups regarding their levels. Concerning subjects studied "Medical History" items, associated factors that were recorded with significant relationships at least at P<0.05 for each of the following factors: hypertension, acute renal infection, renal stone, anemia, Prostatic hyperplasia and family history of renal disease. These factors are candidates as risk factors since there were higher positive cases in the study group compared to what there were in the control group. The association between the studied sample according to previous and current medical history related to risk factors for CKD was significant. the distribution of questions about family history items, which pivoted on the question about the existence of a family history, where the results of the observed responses were relatively high in the study group.

Table (1) represent the distribution of Medical History according to having a diagnosed disease with comparisons significant

Medical History	Study		Control		P-value	OR	95% C.I.
	No.	%	No.	%			
Diabetes					0.105	1.503	0.918 : 2.460
No	97	64.7	110	73.3			
Yes	53	35.3	40	26.7			

Hypertension No Yes	 29 121	 19.3 80.7	 94 56	 62.7 37.3	0.000*	7.004	4.151 : 11.817
Acute renal injury No Yes	41 109	27.3 72.7	150 0	100 0.00	0.000*	4.552	3.552 : 6.110
Renal stone No Yes	 109 41	 72.7 27.3	 88 62	 58.7 41.3	0.011*	0.534	0.329 : 2.460
Anemia No Yes	 30 120	 20.0 80.0	 93 57	 62.0 38.0	0.000*	6.526	3.886 : 10.960
Prostatic hyperplasia No Yes	139 11	92.7 7.3	140 10	93.3 6.7	0.821	1.108	0.456 : 2.692
Family history of renal disease No Yes	106 44	70.7 29.3	118 32	78.7 21.3	0.111	1.531	0.905 : 2.589

Distribution of anthropometric measurements

Table (2) shows the distribution of the studied "anthropometric" measurements, such as "body mass index (BMI) and waist-hip ratio (WHR)", as well as significant comparisons, are illustrated to be sure that the two independent groups are drawn from the same population in light of those variables. Concerning the subjects of studied "anthropometric" measurements, results show that the studied groups recorded no significant differences at P > 0.05. In addition to that, the vast majority of the study group had recorded overweight and obesity levels and they accounted for 84 (56%), while the leftover reported normal and underweight levels. For (WHR), the result showed that most of the study groups were accounted for, and at-risk levels accounted for 147 (98%).

Table (2) represent the distribution of the studied groups according to (BMI), and (WHR) with comparison's significant

Surgical History	Study No. %		Control No. %		P-value
Body Mass Index Under weight Normal weight Overweight Obese	 12 54 40 44	 8.0 36.0 26.7 29.3	 10 41 53 46	 6.7 27.3 35.3 30.7	0.281
Waist to Hip Ratio (cm/cm) Normal	3 42	2.0 28.0	3 27	2.0 18.0	0.119

2000

Over At Risk	105	70.0	120	80.0	

Surgical History

Table (3) shows the distribution of questions about surgical history items, such as Laparoscopic Kidney Surgery, Open Kidney Surgery, and Extracorporeal Shock Wave Lithotripsy (ESWL), as well as significant comparisons, which are illustrated to be sure that the two independent groups are thrown from the same population or not in light of those variables, and in order to explore the factors that register an initial differentiate in light of distribution groups regarding their levels. With respect to subjects studied "Surgical History" items, associated factors were recorded as significant relationships at P<0.01 for the factor "Open Kidney Surgery ". This factor is a candidate as a risk factor since it is associated with higher positive cases in the study group compared to the control group. Noting that the "Extracorporeal Shock Wave Lithotripsy (ESWL)" factor was ignored, which led to more positive responses in the control group than in the study group. This is because the "Extracorporeal Shock Wave Lithotripsy (ESWL)" factor is what makes the relationship between the two groups work.

Table (3) represent the distribution of a Surgical History in the studied groups with comparison significant

Surgical History	Study		Control		P-value
	No.	%	No.	%	
Laparoscopic Kidney Surgery No Yes	143 7	95.3 4.7	138 12	92 8	0.236
Open Kidney Surgery No Yes	125 25	83.3 16.7	141 9	94 6	0.004*
Extracorporeal Shock Wave Lithotripsy (ESWL) No Yes	147 3	98 2	131 19	87.3 12.7	0.000*

Discussions

Distribution of medical history by presence of a recognized illness with meaningful comparisons, Diabetes patients did not differ significantly from CKD controls (P = 0.105), accounting for 53 (35%) of the case participants and 40 (27%) of the control group (OR = 1.503) identical to research conducted in El Salvador, except that it lacked significance (P=0.509) and an increased likelihood of DM (OR=1.3) (Orantes et al., 2011).

Hypertension had highly significant differences (P=0.000) and a high percentage of the study group (121, or 81%) had it, compared to the control group (56, or

37%). If you have hypertension, your risk of developing CKD is 7 times higher (OR = 7.004), and this result is consistent with studies conducted in Saudi Arabia, where 87% of cases had it (Sultana et al., 2020). Acute renal injury patients had significantly higher rates in study group 109 (73%) and the likelihood of having CKD (OR = 4.552%). It fits with a study done in India that found a 2.8-fold higher risk of acute renal illness and highly significant differences (P 0.001) (Maiwall et al., 2020).

In the case group, 41 (27%) and 62 (41%) of the control group had a history of renal stone, and (OR=0.5 CI 95% 0.329 - 2.460) meant that 50% of the odds of developing the disease as the unexposed group, similar to a study conducted in Iran, were (P= 0.0001) and had a 1.3 times greater risk if patients had renal stone (Dehghani et al., 2022). 120 (80%) of the case group and 57 (38%) of the control group both had anemia, and the risk of anemia is 6.5 times higher (OR=6.526) than that of having chronic kidney disease. It is consistent with a Chinese study in which the risk is 1.4 times higher (P 0.001)(Ji et al., 2019).

There was no significant difference in the prevalence of prostatic hyperplasia in males (P=0.821); 11 (7%) of the case group and 10 (7%) of the control group had the condition, and (OR=1.108) indicates that there is no correlation between prostatic hyperplasia and CKD, which is consistent with studies done in (P=0.287) and (OR=1.521)(Hong et al., 2010). Finally, the family history had a highly significant difference (P= 0.000) and the risk was 7.1 times higher, the family history of renal disease had no significant difference (P=0.111) among 44 (29%) of the case group, 32 (21%) of the control group, and the risk was 1.5 times higher if the patients had a family history of renal disease (OR = 1.53). This difference in outcomes is due to the fact that some types of kidney disease may be inherited, the majority of the time, when the disease is discovered in multiple family members, it is not due to genetics, In contrast, kidney illness is brought on by social and environmental factors (Khaleel et al., 2019), as shown in Table 1.

2- According to anthropometric measurements and comparisons, the distribution and correlation between the analyzed sample and chronic renal disease are considerable. The vast majority of the study group reported overweight and obesity levels, accounting for 84 (56%), while the remaining participants reported normal and underweight levels. This is similar to a study conducted in Al-Najaf City, where the vast majority of the study group accounted for 48% of the overweight and obese (Alkhaqani, 2021). In BMI, there is no statistically significant difference when P > 0.05, which is consistent with other research that found no connection between BMI and CKD in the Malaysian study (Leong et al., 2020). The waist to hip ratio does not differ significantly from CKD when P > 0.05, which is consistent with earlier research that found no differences between the two groups. This study is similar to that conducted in Nigeria (Olanrewaju et al., 2020), as shown in Table 2.

3- With significant comparison, the distribution of surgical history in the studied group's laparoscopic kidney surgery had no significant difference (P=0.236) and had 7 (5%) of the case group and 12 (8%) of the control group undergoing laparoscopic surgery. This agrees with the results of other German studies where there is no significant difference with CKD (P=0.08)(Ebbing et al., 2019).

2002

Open kidney surgery had a highly significant difference (P=0.004), with 25 (17%) of the case group and 9 (6%) of the control group undergoing open surgery. When compared to other studies conducted in China, open surgery had a significant difference (P=0.002) with CKD, and these results are consistent (Wang et al., 2022).

Undergoing ESWL, disregarding the factor that came to distribute their positive responses in the control group at a level that exceeds that in the study group, as the ESWL factor achieves the association relationship when compared to another study conducted in Korea that found no significance between ESWL and CKD (P = 0.959). In CKD patients with nephrolithiasis, ESWL stone removal is related to delayed renal function decline (Yoo et al., 2012), as shown in Table 3.

Conclusion

The likelihood of developing CKD was highly correlated with a history of hypertension, acute kidney disease, renal stones, and anemia. Also, both open kidney surgery and extracorporeal shock wave lithotripsy (ESWL) hurt kidney function and make it more likely that you will get chronic kidney disease (CKD). The clinical diagnosis of CKD is not enough, so the study suggests that the GFR test be done regularly on people with hypertension, acute kidney disease, anemia, and ESWL, as well as those who have had open kidney surgery or ESWL, to find people who are at risk for CKD and start treatment early to stop the illness from getting worse and leading to renal failure and death.

Acknowledgments

We would like to express our sincere thanks and gratitude to Medical City Complex, patients for their time to take the information and to the websites that publish their scientific articles and reviews free of charge.

References

ALKHAQANI, A. 2021. Clinical Characteristics and Risk Factors of Chronic Kidney Disease Among Patients Attending Al-Sadder Medical Hospital in Al-Najaf City. *Turkish Journal of Physiotherapy and Rehabilitation,* 32**,** 3.

BIKBOV, B., PURCELL, C. A., LEVEY, A. S., SMITH, M., ABDOLI, A., ABEBE, M., ADEBAYO, O. M., AFARIDEH, M., AGARWAL, S. K. & AGUDELO-BOTERO, M. 2020. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The lancet,* 395**,** 709-733.

DEHGHANI, A., ALISHAVANDI, S., NOURIMAJALAN, N., FALLAHZADEH, H. & RAHMANIAN, V. 2022. Prevalence of chronic kidney diseases and its determinants among Iranian adults: results of the first phase of Shahedieh cohort study. *BMC nephrology,* 23**,** 1-11.

EBBING, J., MENZEL, F., FRUMENTO, P., MILLER, K., RALLA, B., FULLER, T. F., BUSCH, J., COLLINS, J. W., ADDING, C. & SEIFERT, H. H. 2019. Outcome of kidney function after ischaemic and zero-ischaemic laparoscopic and open nephron-sparing surgery for renal cell cancer. *BMC nephrology,* 20**,** 1-17.

HONG, S. K., LEE, S. T., JEONG, S. J., BYUN, S. S., HONG, Y. K., PARK, D. S., HONG, J. Y., SON, J. H., KIM, C. & JANG, S. H. 2010. Chronic kidney disease among men with lower urinary tract symptoms due to benign prostatic hyperplasia. *BJU international,* 105**,** 1424-1428.

JI, A., PAN, C., WANG, H., JIN, Z., LEE, J. H., WU, Q., JIANG, Q. & CUI, L. 2019. Prevalence and associated risk factors of chronic kidney disease in an elderly population from eastern China. *International journal of environmental research and public health,* 16**,** 4383.

Kamaluddin. (2021). Government and Private Collaboration in Coping with Covid-19 in Sorong City. *International Research Journal of Management, IT and Social Sciences*, *8*(5), 333-341. https://doi.org/10.21744/irjmis.v8n5.1907

KAMIL, A. M., HASSAN, S. A. & MAHMOUD, R. A. 2021. Prevalence of chronic kidney disease and hypertension as a risk factor in Basrah province Iraq. *Annals of Tropical Medicine and Public Health,* 24.

KHALEEL, F., HUSSAIN, S. & HMOOD, A. 2019. Risk factors of chronic kidney disease among patients attending Ibn Sina Teaching Hospital in Mosul City. Iraqi JMS. 2019; 17 (1): 24-31. doi: 10.22578. *Editorial Board Members,* 17**,** 24.

KORE, C. A. Y., H.M., 2018. Prevalence of chronic kidney disease and associated factors among patients with kidney problems public hospitals in Addis Ababa, Ethiopia. *J Kidney,* 4(01)**,** 1-5.

MAIWALL, R., PASUPULETI, S. S. R., BIHARI, C., RASTOGI, A., SINGH, P. K., NAIK, V., SINGH, A., JAIN, P., KUMAR, A. & MUKUND, A. 2020. Incidence, risk factors, and outcomes of transition of acute kidney injury to chronic kidney disease in cirrhosis: a prospective cohort study. *Hepatology,* 71**,** 1009-1022.

NALADO, A. M., ABDU, A., MUHAMMAD, H., ABDU, A., SAKAJIKI, A. M. & ADAMU, B. 2012. Prevalence of risk factors for chronic kidney disease among civil servants in Kano. *Nigerian Journal of Basic and Clinical Sciences,* 9**,** 70.

OLANREWAJU, T. O., ADERIBIGBE, A., POPOOLA, A. A., BRAIMOH, K. T., BUHARI, M. O., ADEDOYIN, O. T., KURANGA, S. A., BILIAMINU, S. A., CHIJIOKE, A. & AJAPE, A. A. 2020. Prevalence of chronic kidney disease and risk factors in North-Central Nigeria: a population-based survey. *BMC nephrology,* 21**,** 1-10.

ORANTES, C. M., HERRERA, R., ALMAGUER, M., BRIZUELA, E. G., HERNÁNDEZ, C. E., BAYARRE, H., AMAYA, J. C., CALERO, D. J., ORELLANA, P. & COLINDRES, R. M. 2011. Chronic kidney disease and associated risk factors in the Bajo Lempa region of El Salvador: Nefrolempa study, 2009. *MEDICC review,* 13**,** 14-22.

Ratnawati, I. G. A. A., Suandayani, N. K. T., & Sutapa, G. N. (2019). The linearity of x-ray devices radiation output and its relationship with patient thickness. *International Journal of Physical Sciences and Engineering*, *3*(3), 1–6. https://doi.org/10.29332/ijpse.v3n3.351

SINGH, A. P., GROVER, M. & GAUTAM, A. 2021. Effective Management of Chronic Kidney Disease by Using Ayurvedic Interventions: A Case Report. *International Journal of Ayurveda and Pharma Research***,** 26-30.

SULTANA, S., ALQURASHI, R., ALQARNI, T., ALNEFAIE, M. & ALZAHRANI, R. 2020. Risk factors and knowledge assessment of general public for chronic kidney disease in Taif Region, Saudi Arabia. *World Journal of Advanced Research and Reviews,* 8**,** 123-143.

Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). Get vaccinated when it is your turn and follow the local guidelines. *International Journal of Health Sciences*, *5*(3), x-xv. https://doi.org/10.53730/ijhs.v5n3.2938

WANG, S., LIU, Z., ZHANG, D., XIANG, F. & ZHENG, W. 2022. The incidence and risk factors of chronic kidney disease after radical nephrectomy in patients with renal cell carcinoma.

YOO, D. E., HAN, S. H., OH, H. J., KIM, S. J., SHIN, D. H., LEE, M. J., YOO, T.-H., KANG, S.-W. & CHOI, K. H. 2012. Removal of kidney stones by extracorporeal shock wave lithotripsy is associated with delayed progression of chronic kidney disease. *Yonsei medical journal,* 53**,** 708-714.