



## Knowledge of the General Population about Chronic Kidney Disease

**Maryem Labrassi\*, Fadili Wafaa, Lamiae El Abbady, Meriem Chettati and Inass Laouad**

*Department of Nephrology, Mohamed VI Medical University Hospital, Cadi Ayyad University, Marrakesh, Morocco*

**\*Corresponding Author:** Maryem Labrassi, Department of Nephrology, Mohamed VI Medical University Hospital, Cadi Ayyad University, Marrakesh, Morocco.

**Received:** April 12, 2021

**Published:** April 23, 2021

© All rights are reserved by **Maryem Labrassi, et al.**

### Abstract

Chronic kidney disease (CKD) is a major public health problem in Morocco and around the world. Public awareness is a determinant factor in the adoption of early programs of this disease.

The objectives of our work were to determine the general population's knowledge of the CKD using a questionnaire, and to determine the impact of the participants' epidemiological characteristics on their level of knowledge.

We have managed a descriptive cross-sectional study using a survey carried out among consultants and their companions at primary health care centers in Marrakech. Our study included 200 volunteers aged over 18 years old, not working in the medical field, and having no personal history of nephropathy.

The predominant age group in our survey was between 18 and 29 years (43.5% of cases), with a female predominance 81.5% of the participants were from urban origin and 54.5% of the participants were married. Most of the subjects were schooled (85%), of which 34.5% had completed higher education. High blood pressure and diabetes were found in respectively 12.5% and 18.5% of participants in our study.

In univariate statistical analysis, the factors significantly related to the knowledge of the participants in our study about CKD were: the presence of a family history of CKD, and the personal history of medical intake, diabetes and hypertension.

The consequences of CKD amplify its socio-economic impact and deplete public health resources, hence the crucial need for the participation of the different actors of the health system for the implementation of public awareness programs on CKD. They should be more targeted to people with risk factors of CKD.

**Keywords:** Chronic Kidney Disease; Public Awareness; Risk Factor; Questionnaire; Prevention

### Abbreviations

CKD: Chronic Kidney Disease; HBP: High Blood Pressure; RF: Risk Factor

### Introduction

Chronic kidney disease (CKD) is defined as abnormalities of kidney structure or function, present for more than 3 months, with implications for health [1]. CKD is a major risk factor for end-stage kidney disease, cardiovascular disease and premature death

[2]. Early detection and treatment of CKD in its initial stages may help in the prevention or delaying of disease progression [3]. Public awareness is a determinant factor in the adoption of early programs. However, data on public knowledge about CKD in Morocco is lacking.

Our objective is the determination of general population's knowledge of the CKD using a questionnaire.

**Materials and Methods**

**Type of study**

Descriptive transversal study developed through a survey of the general population of the Marrakech delegation over a period of 2 months

**Target population and sampling**

The population studied was represented by consultants and their companions at primary health centers of the Marrakech delegation (Hay Mohammadi health center, Castor health center) and of the Mohammed VI University Hospital in Marrakech.

**Methodology**

**This study consisted of two phases**

- Phase 1) development and validation of the questionnaire
- Phase 2) A survey to assess the knowledge of the general population on the CKD.

Our questionnaire grouped questions asked by other surveys [8.9.23], whose questionnaires had confirmed internal validity. The final project of the questionnaire is provided as an annex (1).

A total answer score of 50% corresponded to a good knowledge about CKD, a score between 30 and 50% reflected a moderate knowledge and a score < 30% corresponded to poor knowledge.

**Statistical analysis of data**

Data were entered in Microsoft office Excel 2007. Statistical analysis was performed using SPSS software version 17.0.

**Results**

Our study included 200 people. All the subjects agreed to answer the questionnaire. One hundred twenty one were women (60.5%) and 79 were men (39.5%), with a sex ratio (m/f) of 0.65.

The predominant age group was between 18 and 29 years (43.5% of all cases).

In our series, 81.5% were of urban origin and 54.5% of participants were married. Most of the subjects were educated (85%) of whom 34.5% had completed higher education and 62% had a stable job (civil servant, liberal, worker or retired).

Twenty five participants were hypertensive (12.5% of cases), 37 subjects were diabetic (18.5% of cases), 6 people had heart dis-

ease (3% of cases) and 46 participants (23% of cases) regularly took medication for various diseases.

Characteristics	Values (%)
Total number	200 cases
<b>Age range</b>	
18 - 29 years	43,5
30 - 49 years	30,5
> 50 years	26
<b>Sex</b>	
Male	39,5
Female	60,5
Sex ratio M/F	0.65
<b>Location</b>	
Urban	81,5
Rural	18,5
<b>Marital status</b>	
Married	54,5
Single	40,5
Divorced/ widower	5
<b>Studies level</b>	
Illiterate	15
Primary Studies	13,5
Secondary Studies	19
Baccalaureate	18
High Studies	34,5
<b>Profession</b>	
No occupation	38
Official	34
Liberal profession	20,5
Worker	5,5
Retired	2
<b>Personal history</b>	
HBP	12,5
Diabetes	18,5
Heart disease	3
Drug intake	23
<b>Family history</b>	
CKD	14,5

**Table 1:** Socio economic characteristics and clinical data of the patients in our study.

A family history of chronic kidney disease was found in 29 participants, either 14.5% of cases. Among the participants, only 7 subjects (3.5%) have already been sensitized to CKD by the media and health workers.

In our study, 91.5% of the participants knew that we could live with a single healthy kidney. Most of them knew the physiological role of the kidney (91% of cases) and 71% of the participants responded that it does not have a role in blood sugar control, but only 38% of them knew that the kidneys helped to keep bones healthy, 43% of the subjects responded that the kidney helps maintain normal blood pressure, while 43.5% knew it was involved in hemoglobin level regulation.

The majority of those surveyed knew the means of assessing kidney function, but only 12.5% of them knew that this assessment also included blood pressure monitoring.

Among our participants, 92.5% of the subjects knew that vegetable proteins were not harmful to the kidney. However, 85%, 78.5%, 65.5% and 62% of subjects knew, respectively, that foods high in salt, fat, sugar and animal proteins were harmful to the kidneys, while 94.5% of subjects reported that fluid intake was beneficial for the kidneys.

In our series, only 57%, 52.5% and 42.5% respectively of the participants knew that edema, hypertension and reduced kidneys were symptoms of CKD.

Of our participants, 28.5% knew that CKD progresses silently and 84% answered that it can lead to kidney death. The main risk factors for CKD reported by the subjects of our study were kidney stones (89% of positive responses), diabetes (83% of positive responses) and smoking (74% of positive responses), while hypertension was only reported by 65% of participants. In addition, 93% and 86% of participants knew, respectively, that asthma and female sex were not risk factors for CKD.

Among the symptoms of severe CKD reported by the participants, urinary disorders like oliguria were the most cited (88% of participants), followed by fatigue (83%) while edema was only cited in 59.5% of cases, and nausea-vomiting in 34% of cases.

The majority of participants knew that CKD was irreversible (85% of cases) and that certain medications slowed the progression of CKD (92.5% of cases), while 28.5% of those surveyed thought that plants medicinal products were used to treat CKD.

In our study population, 90% of participants knew that certain diets were effective in slowing down the worsening of CKD, among them 63% gave examples of diets: low sodium diet in 36% of cases, low-fat diet in 29% of cases, low-protein diet in 26.5% of cases, low-sugar diet in 25% of cases and the vegetarian diet in 5% of cases.

For possible treatments for CKD, antihypertensive drugs were cited by 33% of participants, dialysis at the stage of kidney death was cited by 93% of participants, and kidney transplantation was reported by 87% of participants. While 20% of those surveyed chose plants as a treatment for CKD.

The mean knowledge score of our study population was 32.71 ± 6.66, with extreme values ranging from 15 to 48.

75.5% of the participants in our survey had good knowledge about CKD of whom 5% had a score of 75%, 23% of the participants had a moderate knowledge and 1.5% of the participants had poor knowledge about CKD.

Question	N = 200 (% of correct answers)
Living with one healthy kidney	183 (91,5%)
<b>Kidney functions</b>	
The kidneys purify the blood of waste products by producing urine	182 (91%)
The kidneys help keep sugar at a normal level in the blood	142 (71%)
The kidneys help maintain normal blood pressure	86 (43%)
The kidneys help fight anemia.	87 (43,5%)
The kidneys help to keep bones healthy	76 (38%)
<b>Kidney health assessment methods</b>	
Blood test	144 (72%)
Urine test	154 (77%)
Fecal test	180 (90%)
Blood pressure monitoring	25 (12,5%)
Kidney ultrasound	169 (84,5%)
Link between diet and kidney health	185 (92,5%)
<b>Food that are harmful to the sick kidney</b>	
Foods high in sugar	131(65,5%)
Foods rich in lipids	157 (78,5%)
Foods rich in animal proteins	124 (62%)

Foods rich in vegetable proteins	185 (92,5%)
Foods rich in salt	170 (85%)
Relationship between fluid intake and kidney health	189 (94,5%)
<b>Symptoms of CKD</b>	
Edema	114(57%)
High blood pressure	105 (52,5%)
Macroscopic hematuria	156 (78%)
Urinary disorders (polyuria, oliguria, nocturia)	162 (81%)
Small kidneys	85 (42,5%)
Evolution of CKD towards renal death	168 (84%)
Frequent character of CKF	173 (86,5%)
Importance of screening for CKD	186 (93%)
Silent character of CKD	57 (28,5%)
<b>Risk factors of CKD</b>	
Diabetes	166 (83%)
Female sex	172 (86%)
Male sex	35 (17,5%)
High blood pressure	130 (65%)
Heart problems	103 (51,5%)
Asthma	186 (93%)
Obesity	142 (71%)
Kidney stones	178 (89%)
Smoking	148 (74%)
Low birth weight	11 (5,5%)
<b>Symptoms of sever CKD</b>	
Edemas	119 (59,5%)
Epistaxis	14 (7%)
Nausea/vomiting	68 (34%)
Loss of appetite	103 (51,5%)
Tired	166 (83%)
Pruritus	12 (6%)
Urinary disorders	176 (88%)
Irreversible nature of CKD	170 (85%)
Slowing of progression of CKD by certain drugs	185 (92,5%)
Slowing of progression of CKD by certain diets	180 (90%)
<b>Possible treatment for CKD</b>	
Antihypertensive drug	66 (33%)
Low protein diet	168 (84%)
Dialysis in the stage of kidney death	186 (93%)
Kidney transplant	174 (87%)
plants	160 (80%)

**Table 2:** Percentage of correct answers to the various elements of the questionnaire.

In univariate analysis, the factors significantly related to knowledge about CKD were: the presence of a family history of CKD, and a personal history of drug use, diabetes and hypertension (Table 3).

Factors		Average of correct answers	Univariate analysis (P)
Age	<50 years	32,15 ± 6,75	0,04
	>50 years	34,26 ± 6,20	
Civil status	Married/widower/divorced	32,91 ± 6,32	0,58
	single	32,40 ± 7,17	
Environment	Urban	32,99 ± 6,52	0,20
	Rural	31,46 ± 7,22	
High studies	Yes	32,64 ± 6,75	0,85
	No	33,82 ± 6,54	
Profession	Workers + retired	33,15 ± 7,12	0,23
	Without profession	31,99 ± 5,82	
Family history of CKD	Yes	38,72 ± 4,12	P < 0,01
	No	31,68 ± 6,48	
Drug intake	Yes	35,80 ± 4,90	P < 0,01
	No	31,78 ± 6,85	
History of HBP	Yes	35,88 ± 3,39	P < 0,01
	NO	32,25 ± 6,89	
History of diabetes	Yes	36,27 ± 4,44	P < 0,01
	No	31,90 ± 6,83	
Already aware of CKD	Yes	33 ± 3,162	0,90
	No	32,69 ± 6,76	

**Table 3:** Factors influencing participants' knowledge of CKD.

**Discussion**

CKD is an important public health problem, particularly in developing countries. Of various etiologies, it is most often linked to diabetes and high blood pressure and is associated with significant morbidity and mortality, particularly cardiovascular and mineral- osseous.

The consequences of CKD amplify its socio-economic impact and deplete public health resources, especially in developing countries.

Knowledge of CKD and its risk factors increases the perception of risk and improves the participation of the general population in screening in order to be able to make an early diagnosis [4].

Several studies have reported a low level of knowledge in patients with different stages of CKD [5,6].

This level of knowledge is even lower in the general population, which can be a major obstacle to the success of preventive measures for CKD [7].

Most of the participants in our study (91%) knew about the physiological role of the kidneys, while only 43%, 43.5% and 38% of our questionnaire respondents, respectively, knew that the kidneys help maintain normal blood pressure, struggle against anemia and helped keeping bones healthy. These results were better compared to the study by Gheewala, *et al.* [8], and weaker compared to the study by Wright, *et al.* [9].

Many participants replied that the health of the kidneys could be assessed by a blood test (72%) and by a urine test (77%), these results join those of the Australian study by Gheewala, *et al.* [8], and of Hong Kong by Chow, *et al.* [10]. It is of concern that the general public underestimates the importance of controlling blood pressure. In our study only 12.5% of participants knew that BP monitoring also helped assessing kidney health. This percentage was much lower than those reported in other studies [8,10].

Among the factors linked to lifestyle, diet seems to play a very important role in the prevention and development of CKD [11,12]. This explains the growing scientific interest in studying its effect on kidney health [13,14], particularly for high protein diets (1.2g/kg/day) which induce a significant deterioration in renal function by modulating renal hemodynamic by increased renal blood flow and intraglomerular pressure [15].

In our study, 94.5% of participants affirmed that there is a link between diet and kidney health, on the contrary to what was reported by White, *et al.* (25.7%) [16] and Oluyombo, *et al.* (63.5%) [17]. In addition 65.5%, 85% and 62% of participants in our survey identified that foods high in sugar, salt and animal protein, respectively, were potentially dangerous for kidney health, these percentages were higher than those reported in other studies [10,16,17].

Several studies support the substitution of animal proteins by vegetable proteins because of their beneficial effect in reducing the severity of arterial hypertension, hyperphosphatemia and metabolic acidosis [18].

In our study 92.5% answered that foods rich in vegetable protein were not harmful to the kidneys.

Water is also an essential nutrient that has an impact on kidney health [19]. The deleterious effect of low water intake on the

kidneys has been previously confirmed in several studies, which have shown an association between the risks of developing kidney failure and reduced daily fluid intake [20-22].

In our series, 94.5% of participants knew there was a link between fluid intake and kidney health, while in Roomzadeh, *et al.* studies the percentage of a correct response was lower (16.8%) [23].

A better knowledge of the risk factors of CKD allows a better awareness of the disease thus increasing the chances of early detection. Several studies have shown that diabetes and hypertension were the most common factors associated with CKD [24-26].

In our series, 65% of participants identified hypertension as the risk factor of CKD. This percentage was higher than that reported by the Australian study by White, *et al.* (2.8%) [16], by an Iranian study (14.4%) [23], and by a study in Hong Kong (43, 8%) [17].

The percentage (83%) of participants who correctly identified diabetes as RF of CKD in our study was high compared to 8.6%, 12.7%, 40.1%, 49%, and 60.6% reported by White, *et al.* [16], Roomzadeh, *et al.* [23], Chow, *et al.* [10], Oluyombo, *et al.* [17] and Gheewala, *et al.* [8] respectively.

In our study, 92.5% of participants knew that certain medications could slow the worsening of CKD. This result is close to those reported in the study by Chow, *et al.* [10]. Nonetheless, 28.5% of those surveyed were convinced that herbs were good for treating CKD.

This finding was reported by 44.6% of the participants to Oluyombo, *et al.* [17]. This remains a phenomenon observed in several developing countries [27-29], as in high-income countries where the use of herbal medicines is increasingly increasing [30], although it has been confirmed that certain herbal supplements have been associated with the development of chronic kidney disease [31] and acute kidney injury [32].

In our survey, we found that participants with familial history or with a risk factor of CKD (Diabetes/HBP) had a higher level of knowledge than others. This observation was consistent with findings from surveys of knowledge of CKD among African Americans [33], Australians [8], and Iranians [23].

In our study, we did not find a significant relationship between socio-demographic characteristics and knowledge of CKD except

for age. Indeed, we found that participants > 50 years old tended to have better knowledge about CKD. Contrary to our study, the influence of socio-demographic characteristics on the level of knowledge of CKD has been demonstrated in a number of previous studies. In a study by Chow, *et al.* [10], the authors indicated that participants with advanced age, low education and low monthly income were more likely to have limited knowledge of CKD.

The subjects in our study who had higher education tended to have better knowledge about CKD, but this difference were not statistically significant.

The positive association between educational level and better knowledge about CKD has been reported by other studies [10,17].

### Conclusion

Chronic kidney disease remains a major public health problem, due to its multiple complications and its frequency that have steadily increased in recent years around the world. The late referral of patients with CKD remains very frequent in our context, which increases the risk of progression to advanced stages of the disease and the need of renal replacement therapy.

Our study showed that the level of general knowledge of the population studied was satisfactory. However, the majority of participants in our study had gaps concerning the role of hypertension in the occurrence of CKD and the nephrotoxic potential of medicinal plants.

The results of our study send a warning signal on the crucial necessity for the implementation of public awareness programs on CKD, and that they must be more targeted to people with risk factors for CKD. This requires the participation of the various actors of the health system.

Further studies would be desirable in order to include more people and to have a more representative sample of the general Moroccan population.

### Conflict of Interest

Declare if any financial interest or any conflict of interest exists.

### Bibliography

1. KDIGO. "Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease" (2012).

2. Jha V., *et al.* "Chronic kidney disease: global dimension and perspectives". *Lancet* 382.9888 (2013): 260-272.
3. Johnson DW., *et al.* "KHA-CARI guideline: early chronic kidney disease: detection, prevention and management". *Nephrology (Carlton Vic)* 18.5 (2013): 340-350.
4. Veluswamy SK., *et al.* "Awareness of chronic disease related health benefits of physical activity among residents Of a rural South Indian region: A crosssectional study". *International Journal of Behavioral Nutrition and Physical Activity* 11 (2014): 27.
5. Wright Nunes J A., *et al.* "Associations among perceived and objective disease knowledge and satisfaction with physician communication in patients with chronic kidney disease". *Kidney International* 80.12 (2011): 1344-1351.
6. Tan AU., *et al.* "Patient perception of risk factors associated with chronic kidney disease morbidity and mortality". *Ethnicity and Disease* 20 (2010): 106-110.
7. Zhang L., *et al.* "Prevalence of chronic kidney disease in China, a cross-sectional survey". *Lancet* 379 (2012): 815-822.
8. Gheewala P A., *et al.* "Public knowledge of chronic kidney disease evaluated using a validated questionnaire: a cross-sectional study". *BMC Public Health* 18.1 (2018).
9. Wright J A., *et al.* "Development and Results of a Kidney Disease Knowledge Survey Given to Patients With CKD". *American Journal of Kidney Diseases* 57.3 (2011): 387-395.
10. Chow KM., *et al.* "Public lacks knowledge on chronic kidney disease: telephone survey". *Hong Kong Medical Journal* 20.2 (2014): 139-144.
11. Strippoli GF., *et al.* "Fluid and nutrient intake and risk of chronic kidney disease". *Nephrology* 16 (2011): 326-334.
12. Yuzbashian E., *et al.* "Sugar-sweetened beverage consumption and risk of incident chronic kidney disease: Tehran Lipid and Glucose Study". *Nephrology (Carlton)* 21 (2015): 608-616.
13. Bach KE., *et al.* "Healthy dietary patterns and incidence of CKD: a meta-analysis of cohort studies". *Clinical Journal of the American Society of Nephrology* 14 (2019): 1441-1449.
14. Ajarapu AS., *et al.* "Dietary patterns and renal health outcomes in the general population: a review focusing on prospective studies". *Nutrients* 11 (2019): 1877.
15. Kalantar-Zadeh K., *et al.* "North American experience with Low protein diet for Non-dialysis-dependent chronic kidney disease". *BMC Nephrology* 17 (2016): 90.

16. White SL, et al. "Limited knowledge of kidney disease in a survey of AusDiab study participants". *The Medical Journal of Australia* 188.4 (2008): 204-208.
17. Oluyombo R, et al. "Awareness, knowledge and perception of chronic kidney disease in a rural community of south-West Nigeria". *Nigerian Journal of Clinical Practice* 19.2 (2016): 161-169.
18. Joshi S, et al. "Adequacy of Plant-Based Proteins in Chronic Kidney Disease". *Journal of Renal Nutrition* 29.2 (2019): 112-117.
19. Drewnowski A, et al. "Water and beverage consumption among adults in the United States : Cross-sectional study using data from NHANES 2005-2010". *BMC Public Health* 13 (2013): 1068-1077.
20. Strippoli GF, et al. "Fluid and nutrient intake and risk of chronic kidney disease". *Nephrology (Carlton)* 16.3 (2011): 326-334.
21. Clark WF, et al. "Urine volume and change in estimated GFR in a community-based cohort study". *Clinical Journal of the American Society of Nephrology* 6.11 (2011): 2634-2641.
22. Sontrop JM, et al. "Association between water intake, chronic kidney disease, and cardiovascular disease: a cross-sectional analysis of NHANES data". *American Journal of Nephrology* 37.5 (2013): 434-442.
23. Roomizadeh P, et al. "Limited knowledge of chronic kidney disease and its main risk factors among Iranian community: an appeal for promoting national public health education programs". *International Journal of Health Policy and Management* 2.4 (2014): 161-166.
24. Levey AS, et al. "The definition, classification, and prognosis of chronic kidney disease : KDIGO Controversies Conference report". *Kidney International* 80.1 (2011): 17-28.
25. Vos T, et al. "Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the global burden of disease study 2013". *Lancet* 386.9995 (2013): 743-800.
26. Sugiura T, et al. "Dietary salt intake is a significant determinant of impaired kidney function in the general population". *Kidney Blood Press Research* 43 (2018): 1245-1254.
27. Sumaili E K, et al. "High prevalence of undiagnosed chronic kidney disease among at-risk population in Kinshasa", the Democratic Republic of Congo". *BMC Nephrology* 10 (2009): 18.
28. Mohamed R E F, et al. "Profil des insuffisants rénaux chroniques diabétiques à l'initiation de l'hémodialyse au service de Néphrologie et dialyse de l'hôpital militaire de Rabat, Maroc». *Pan African Médical Journal* 15 (2013): 124.
29. Yaw A A, et al. "Clinical and demographic characteristics of chronic kidney disease patients in a tertiary facility in Ghana". *Pan African Medical Journal* 18 (2014): 274.
30. Keller N, et al. "Sodium, hypertension, maladies rénales et santé publique». *Néphrologie and Thérapeutique* 14 (2018): S93-S98.
31. Ohta Y, et al. "High salt intake promotes a decline in renal function in hypertensive patients: a 10-year observational study". *Hypertens Research* 36 (2013): 172-176.
32. Wong MM, et al. "The science of salt: a regularly updated systematic review of salt and health outcomes (December 2015-March 2016)". *Journal of Clinical Hypertension (Greenwich)* 19.3 (2017): 322-332.
33. Levey AS, et al. "Chronic kidney disease as a global public health-problem approaches and initiatives - a position statement from Kidney Disease Improving Global Outcomes". *Kidney International* 72 (2007): 247-259.

**Volume 4 Issue 8 August 2021**

© All rights are reserved by Maryem Labrassi, et al.