Revista trimestral
FARMACÉUTICOS COMUNITARIOS
Volumen 16 Nº 2 | 2024 www.farmaceuticoscomunitarios.org
SEFAC
Sociedad Española de Farmacia Clínica, Familiar y Comunitaria

Screening for Chronic Kidney Disease in the Community Pharmacy. CRIERFAC Study: Description of the Methodology

Luis Salar Ibáñez[1], José Espejo Guerrero[2], Eduardo Satué[3], Noemí Pérez León[4], M. Lourdes Martínez-Berganza Asensio[5]

1. PhD Pharmacy, director of 'Farmacéuticos Comunitarios', Assistant lecturer at Universidad Cardenal Herrera – CEU, Community Pharmacist at Valencia. 2. PhD Pharmacy, Community pharmacist in Adra (Almería). 3. Community pharmacist in Maella (Zaragoza). 4. General practitioner. Gran Sol Primary Health Center. Badalona. Barcelona. 5. General practitioner. Ensanche de Vallecas Health Center. Madrid.

KEYWORDS

Chronic kidney disease, Community pharmacy, Screening

ABBREVIATIONS

BMI: Body mass index
CGCOF: General Council of Official Colleges of Pharmacists
CKD: Chronic kidney disease
CP: Community pharmacies
eGF: Estimated glomerular filtration
GF: Glomerular filtration
GP: General practitioner
RRT: Renal replacement therapy

ABSTRACT

Chronic kidney disease (CKD) is the existence of abnormalities in renal structure or function with an impact on health. This is usually considered when estimated glomerular filtration (eGF) falls under 60 mL/min/1.73m^2. Its clinical course leads to renal replacement therapy (dialysis or transplant) when eGF falls under 15 mL/min/1.73m^2. Screening in at risk populations has been proven to be cost-effective. The aim of this work is to perform CKD screening in the community pharmacy. In this publication we report and justify the methodology in detail.

Methodology: Pharmacists from the community pharmacies taking part selected patients who complied with inclusion and not exclusion criteria. Creatinine was measured by means of a finger prick and eGF calculated with the formula CKD-EPI. If this is lower than a set value, which depends on age, referral to the general practitioner takes place.

Results: a total of 141 out of 200 pharmacies took part in the study. In all 2116 patients were recruited and 116 patients were lost. The final sample size was 2000 patients.

Discussion: the protocol was successfully implemented by community pharmacists and was extremely well received by community pharmacy users. The age adjustment for eGF thresholds provides a novel additional filter. The aim is not to overburden primary care centres with potential referrals of false positives. Confirmation of the diagnosis is subject to voluntary communication by the patient to the pharmacist.

INTRODUCTION

Chronic kidney disease (CKD) is defined as the *existence of abnormalities in renal structure or function over a period greater than three months, with health consequences regardless of the cause* (1). This is highlighted by means of decreased glomerular filtration (GF) below 60 mL/min/1.73 m^2 and/or the existence of a kidney lesion or damage. This is revealed by structural abnormalities of the kidney on imaging tests or because of the existence of albuminuria, proteinuria, abnormalities in the urinary sediment or hydroelectrolytic abnormalities (1). Glomerular filtration under 60 mL/min/1.73 m^2 entails a risk of mortality that increases as GF decreases (2). The course of CKD leads to renal replacement treatment (RRT) (renal dialysis or transplant) when GF falls below 15 mL/min/1.73 m^2. In 2022 in Spain a total of 7,119 people commenced RRT, which means an incidence of 150 per one million inhabitants. A total of 66,982 people were under RRT, 2% more than in 2021 (prevalence of 1410.9 patients per one million inhabitants) (3).

Cite this article as: Salar L, Espejo J, Satué E, Pérez N, Martínez-Berganza ML. Screening for Chronic Kidney Disease in the Community Pharmacy. CRIERFAC Study: Description of the Methodology. Farm Comunitarios. 2024 Apr 11;16(2):5-13. doi:10.33620/FC.2173-9218.(2024).12
Funding: The CRIERFAC study was funded by AstraZeneca.
Conflict of interest: None.
Corresponding author: Luis Salar Ibáñez (l.salar.000@micof.es).
Received: 20/02/2024
Accepted: 21/03/2024
Availabe online: 11/04/2024
ISSN 2173-9218

Screening in at risk populations has been proven to be cost effective (4). This can be performed in primary care consultations for any other reason. Screening can also be undertaken in the community pharmacy as revealed by various global studies. These studies are mainly Canadian, in which CRF screening is performed (5-9); and a study project not yet undertaken (10).

In Spain there is no record of strictly screening studies. There is a study in which community pharmacies intervene in regard to dose adjustment and detection of nephrotoxic medicines in patients with low GF; whereby a detection test was previously applied in at risk patients. However, the aim was not to perform screening per se (11).

Therefore, this project considers the suitability of performing systematic screening for CKD in a community pharmacy setting. In 2023, the Spanish Society for Clinical, Family and Community Pharmacy (SEFAC), with the collaboration of the Spanish Society for General Practitioners (SEMERGEN) and financing from AstraZeneca undertook the CRIERFAC study (Screening for Chronic Kidney Disease in Community Pharmacy) whose aim is to contribute to early medical diagnosis of CKD patients by means of determining estimated GF.

AIMS

The aim of this paper is to set out the methodology used in a detailed and reasoned way and compare this to other studies performed in community pharmacy.

METHODS

Multicentre, descriptive, observational study performed between January and November 2023. The study was performed in 200 voluntary community pharmacies (CP) distributed all over Spain. The procedure was agreed with SEMERGEN to determine patients' inclusion/exclusion criteria, referral criteria and to promote collaboration among general practitioners (GP) and community pharmacists. Pharmacists taking part received online training by means of a webinar that was recorded and made available to participants for subsequent consultation.

Study Population

The underlying population to obtain the sample are CP users. Sample size was calculated assuming the results of CKD epidemiological studies in Spain, IBERICAN (12) and ENRICA (13). Prevalence was determined, around 15%, assuming an error of +/- 2% and a confidence interval of 95%. A total of 1225 individuals was necessary with these assumptions. Foreseeing 10% losses, mainly due to absence/low quality data a minimal sample size of 1348 people was estimated.

Sampling was by conglomerate. First, CP sampling was performed (Conglomerate or Cluster). Therefore, starting with the CP database in Spain (CGCOF), CP were selected in proportion to the number of CP in each autonomous community and within them the number of CP in each province and within these in proportion to the percentages of urban/rural CP (14). Once these values were set SEFAC partner pharmacists who previously showed interest in taking part were randomly selected until the quotas of each condition were fulfilled.

Patient sampling was consecutive in the working hours of the researcher. The opportunity to take part was offered to people who came to pharmacies over the study period and who fulfilled the inclusion and not the exclusion criteria.

Inclusion Criteria

- Have signed informed consent to take part in the study.
- Aged over 45.
- No record by the patient of a creatinine determination in the last year.
- And at least one of the following risk factors.
  - Over 60.
  - Hypertension.
  - Type 2 diabetes mellitus.
  - Established cardiovascular disease.
  - Obesity (BMI > 30 kg/m^2 and < 35 kg/m^2).
  - Type 1 diabetes mellitus with at least 5 years clinical course.
  - Other cardiovascular risk factors (dyslipidaemia, smoking).
  - Family history of CKD in first degree relatives.
  - Prolonged treatment (over 3 months) with nephrotoxic medicines (NSAIDs, calcineurin inhibitors, lithium, some anti-infectious agents, etc.).

Exclusion Criteria

- Aged under 45.
- Patients already diagnosed with CKD.
- Patients with one creatinine analysis of under 12 months
- Patients with cognitive or idiomatic difficulties that hinder them entering the study.
- Patients in whom the CKD-EPI formula cannot be applied
  - Extreme BMI (<19 o >35 kg/m^2).
  - Patients with special diets (strict vegetarian, creatine supplements) or malnourished.
  - Abnormalities in muscle mass (amputations, muscle weight loss, myopathies or paralysis).
  - Severe liver disease, generalized oedema, ascites
  - Pregnant women.

Sample randomization

Each pharmacist randomized the times of each day during which patients who come in at this time and fulfil the criteria will be offered consecutive participation.

Test

Patients who agreed to take part underwent a creatinine test by means of dry chemistry in a small capillary blood sample (1.2 µL) obtained by means of a finger prick. The Nova Max Pro Creat eGFR® measuring device from Nova Biomedical was used for this. This device measures creatinine in blood and calculates eGF by means of the CKD-EPI formula. It gives a result in 30 seconds. Its measuring range is 0.30- 7.00 mg/dL. Sensitivity and specificity are 98.9% and 85.3%, respectively. Operating room temperature is 15-40 ºC leading to an error outside this interval. This device has been validated for use in community pharmacies (15). It was supplied to each participating pharmacy along with 100 test strips and control solutions for high and low creatinine concentrations.

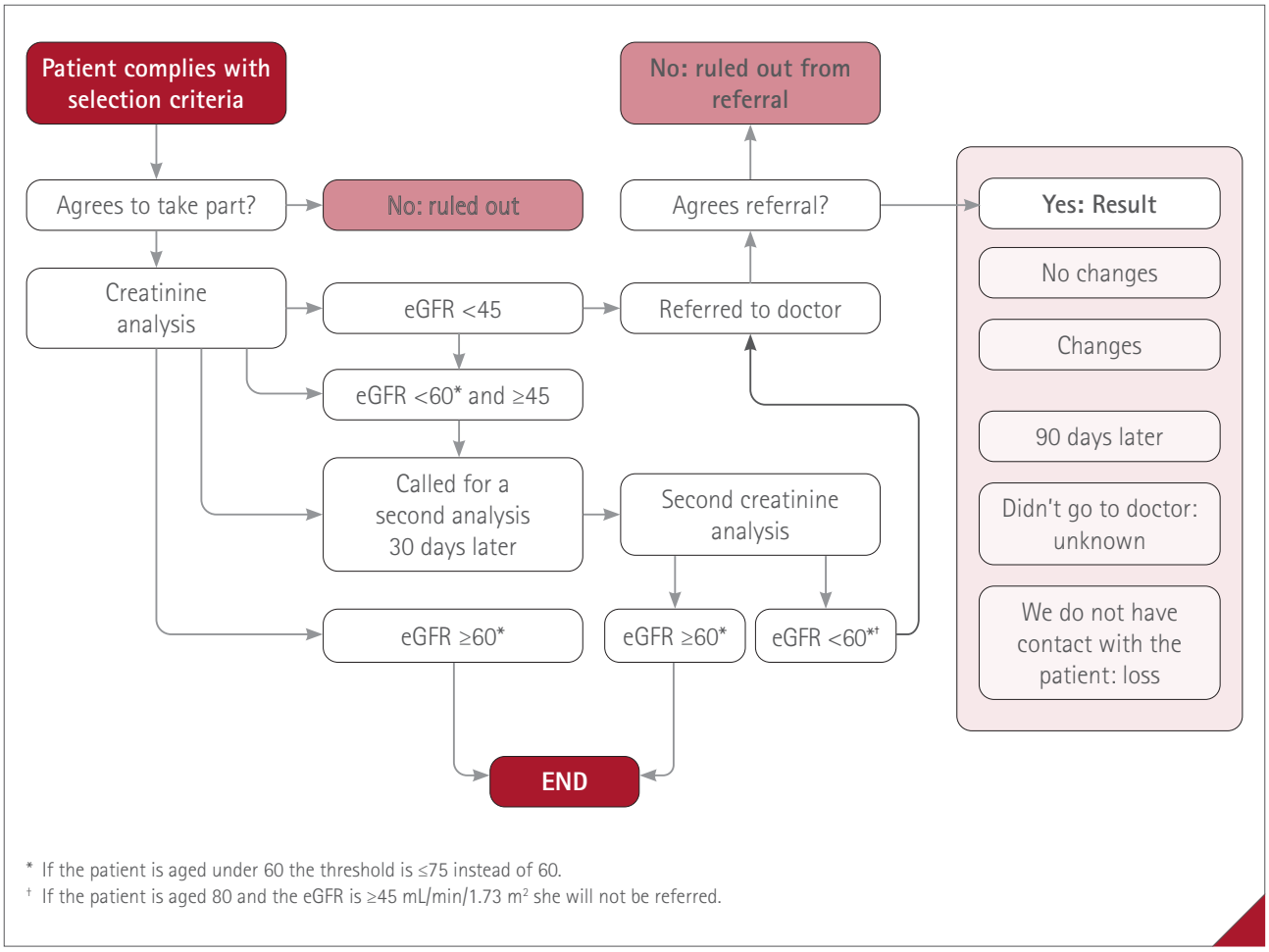
Procedure

Patients who come into the pharmacy during the randomly set time each day for the study were offered the chance to take part. Therefore, the aim and the procedure was explained to them and they were handed an information sheet. If they agreed and signed the informed consent they were taken to the personalized treatment area and a creatinine and eGF analysis was performed with the Nova Max Pro measuring device.

According to the test result, in accordance with the protocol's threshold, the intervention may lead to completion. In the event of a result higher than the threshold, or if lower than the threshold, two possibilities arise; refer directly to the GP, or suggest a second measurement one month later in a case classified as query.

All the details can be seen in **Figure 1**. Written information on chronic kidney disease was handed out in all cases (**See Appendix 1**).

If the patient is referred to the GP he is requested to subsequently notify us of the doctor's decision; and if possible, the GF measurement performed in the public health system.



* If the patient is aged under 60 the threshold is ≤75 instead of 60.
† If the patient is aged 80 and the eGFR is ≥45 mL/min/1.73 m² she will not be referred.

Figure 1 Screening procedure

Statistical Tests

The data source for the variables recorded are as below:

- From the inclusion and exclusion criteria: patient declaration at the interview after signing the informed consent.
- Height and weight: measures taken in situ at the time of patient capture.
- Creatinine and eGFR: capillary blood determination with the Nova Max Pro Creatinine eGFR meter® measuring device.
- From referral and action of the GP: patient declaration at subsequent CP visits.

This was all recorded in a centralized way by means of a specific platform within the SEFAC-eXPERT® pharmaceutical database (16). Pharmacists taking part were given specific instructions for this.

This observational study was performed in accordance with the ethics principles set out in the Declaration of Helsinki, ICH GCPs, GPP and prevailing legislation on Non-Interventionist and/or Observational studies. The final protocol was approved by Aragón Research Ethics Committee (CEICA) with code PI22-446.

The statistical analysis was performed in accordance with the aims set out. After a sample description with means and percentages according to type of variable (quantitative or qualitative), the screening result was evaluated in accordance with the agreed criteria for the study **(Figure 1)**: percentage of positives in screening, as first or second determination, acceptance of the referral and subsequent communication of doctor interventions.

RESULTS

Data from 141 out of a total of 200 pharmacies from 40 provinces were recorded. In all 2116 patients were recruited and 116 patients were lost. Final sample size was 2000 patients.

The distribution of pharmacies and patients by provinces can be seen in **Appendix 2 (⏭)**.

DISCUSSION

A PubMed "ckd screening" AND "Community pharmacy" search strategy only produced seven papers of which three were not undertaken in a community pharmacy setting. Other searches detected other studies. However, there are very few. **Table 1** contains a comparison of all of these with our own study.

All of them selected patients because they had risk factors. The test performed was eGF except one that used the likelihood of developing CKD over the next five years. The age of inclusion is not always specified. The threshold for a positive result is mainly 60 mL/min/1.73 m^2 and does not depend on age. In one the positive result is being diagnosed and in another it is having more than 3% likelihood of developing CKD in five years. In all of these it is specified that the patient must not have a CKD diagnosis. Some of these indicate that this is verified by consulting the clinical record. However, none of them specify anything in regard to the analysis performed in the last 12 months.

This study has the highest "n" of those evaluated, more than double the next one. There is a study project that considers a higher "n". However this remains unpublished to March 2024.

Table 1 Comparison of the studies published on CKD screening in the community pharmacy

Study	Place	n	Test	Age	Threshold
CRIERFAC	Spain	2116	eGF	>45	Variable according to age
Gheewala PA et al. (5)*	Australia	389	Risk of CKD in 5 years	50-74	>3%
Donovan J et al. (6)	Canada	108	eGF	>18	<60 ml/min/1.73 m^2
Al Hamarneh YN et al. (7)	Canada	720	eGF	63**	<60
Papastergiou J et al. (8)	Canada	642	eGF	60**	<60
Stéphanie Belaiche et al. (9)	France	532	eGF	70**	>60
Tesfaye W et al. (10)***	Australia	3660	eGF	35-74	Diagnosed

* This study does not measure eGF. The risk of suffering from moderate-severe CKD in the next five years is calculated with the QKidney®-2018 risk calculator. The result is the percentage of patients at risk that had undertaken eGF measurement. https://qkidney.org/index.php

** The age threshold to recruit patients is not specified. The mean age of patients recruited is specified.

*** Study not performed. What is published is the project. Prevalence is what is expected to be obtained and was used to calculate the sample. The patient has to be diagnosed for a positive screening result. No eGF threshold is specified.

RATIONALE

Sample selection

As in all screening, the study population should be undiagnosed people. Given that the CP has no access to the clinical history it is not possible to know for sure who is diagnosed and who is not. To improve the efficiency of the screening some very restrictive inclusion and exclusion criteria was agreed with the SEMERGEN nephrology work group. Therefore, having a blood test of less than one year was set out as an exclusion criteria as the GF test is usually included in the basic analysis. The hypothesis is that it is possible that the patient is unaware of their renal condition. However, their GP will know whether a creatinine analysis has recently been performed. The patient will likely recall that an analysis was undertaken. But they may not know whether or not creatinine was analyzed as this is not a well-known parameter. It is likely that this parameter was taken if they have one of the risk factors specified. Nonetheless, there is a major under diagnosis of stage 3 CKD as highlighted by the REVEAL-CKD study (17). All these risk factors are mentioned in the references (1).

An available analysis of under one year was a relevant exclusion criteria. In general a greater availability of analysis in rural areas compared to urban areas was observed (unpublished data).

Thresholds

Unlike other studies performed, various thresholds were agreed with SEMERGEN according to the patient's age. The reason is that a young patient (aged 45-60) with a eGF under 75 is at risk. And it is quite normal for a patient aged over 80 to have a eGF 45-60 and less risk of ending up with terminal CKD (18).

Randomization

If screening is performed for a reason purely in regard to treatment randomizing the sample is not necessary. This is offered to patients according to availability. However, if what is sought is a research study sample randomization is essential. We cannot select the first patients who enter as done in many studies; because there are patients who always come first thing in the morning and others come in the afternoon. For the sample to truly be random and for the patients to have the same probability of being selected, the study period itself is randomized. The times of each day offered to everyone coming in. If one or two hours are randomly selected during that period we can guarantee that everyone who comes in is made an offer for screening.

Impact

The screening result is the proportion of patients detected with eGF lower than the thresholds set out. It should be noted that the community pharmacist does not make any diagnosis. Therefore, to know the actual impact of the intervention it is useful to know whether or not the GP has confirmed the diagnosis. The data would be simple to obtain in the event there were access to the patient's summarized clinical record. However, unlike in other countries, in Spain this collaborative practice does not yet exist. Therefore, the confirmation or refutation of the data obtained in the community pharmacy depends on the patient or doctor's availability in notifying them, which complicates the systematic analysis. This is a limitation of this study.

CONCLUSION

The methodology used enables community pharmacies to systematically screen for CKD. The protocol has been successfully implemented by community pharmacists. The age adjustment of thresholds for eGF provides a novel additional filter with the aim of not overburdening primary care centres with potential referrals of false positives. Confirmation of the diagnosis is subject to voluntary communication by the patient to the pharmacist since pharmacists in Spain have no access to the patient's summarized clinical record.

ACKNOWLEDGMENTS

To all the pharmacists who participated in the study. In alphabetical order: Antonio Aguilar Ros, Eduardo Agustín Álvarez, Ángel Alejandre Dueñas, José Luis Allué Blasco, María Luisa Alonso Núñez, Bartomeu Amengual Riera, Joana Ana Amengual Sastre, María Amigó Avellán, Leire Andraca Iturbe, Irune Andraca Iturbe, Mª Victoria Andreu Fauquet, Mónica Anzola Cabo, Mª Dolores Arce Trueba, Vicente Javier Baixauli Fernández, Carmen Baldonedo Mosteiro, Eva Boscasa, Joaquín Braun Vives, Elena Brosed Junza, César Cabrerizo Izquierdo, María Nieves Caelles Franch, Amparo Calero Barreda, Begoña Camarón Echeandia, Marina Cánovas Mata, José Daniel Carballeira Rodríguez, Francisco Casamayor Sebastián, José Chacón Hernández, Francisco Javier Chantada Abal, Mª Teresa Climent Catalá, Rodrigo Contreras Jiménez, María Esther Cortes Fernández, Javier Cremades Alcaraz, María Consolación Cremades Prieto, Miguel de la Fuente Martínez, Mª José de la Matta Martín, Diego de la Morena Frutos, Jacinta del Campo Molina, Mercedes Díaz Casas, Cristina Díaz Jiménez, María Díaz-Laviada Marturet, Cristina de Diego Martínez, María Domínguez Barragán, Elena Dualde Viñeta, Covadonga Dupuy Arnau, Montserrat Escalada Abraham, Carlos Escolano Martínez, Irene Escudero Rivera, José Espinosa Navarro, Nieves Fernández de Arcaya Gainza, Clara Frau Bonafé, Ana Freire Bodelo, José Enrique Fuentes de Frutos, Irene Gallego Berisa, Judith García González, Luis García Moreno, Luis García Sevillano, Pablo

García Vivanco, Marta García-Delgado Morente, Amalia García-Delgado Morente, Juan Gil Rodríguez, Alaitz Golzarri Saiz, Mª Paz Gómez Dura, Luis Carlos González Betancort, Ángela González Hernández, Paola González Hernández, Carlos González Montenegro, María del Pilar González Pérez, Alicia González Rodríguez, Itziar González Rodríguez, Carlos Gracia Castellví, Beatriz Iriarte Cemborain, Pilar Izquierdo Martínez, Ignacio Jane de Rosales, Irene Jaraiz Magariños, Cristina Jaraquides López, Mª José Julián Pascual, Alicia Justo Hernández, Silvia Lapieza Olano, María José Liso Aldaz, Magdalena Lloret Gorgoll, Rosa Llull Vila, Ferran Llusá Bayés, Cristina Lobato Rodríguez, Silvia López Alaiz, Pilar López Villodre, Raúl Luque del Moral, Elena Martín Fernández, María Belén Martín Hernández, Adela Martín Oliveros, Marta Martínez Cabarga, Olivia Martínez Monge, Rafael Martínez Olmedo, Miguel José Martínez Orozco, Mª Luisa Martínez Rodríguez, Pilar Méndez Mora-Figueroa, Lucila Magdalena Menéndez Bueno, Eloi Merencio Naudin, Carme Mestres Català, Francisca Miralles López, Ana Molinero Crespo, Almudena Montero Muñoz, Isabel Morcuende Campos, Pablo Morell Gutiérrez, Marta Mundet Tarragó, Cristina Muñoz García, Mª Dolores Murillo Fernández, Mª Luisa Murillo Fuentes, Jaime Ortega-Meder Díez, Eloísa Pardo Calvo, Laura Parras Gallego, Mercedes Peña Hurtado, Juan Ernesto Peña Ros, Felipe Alfonso Peñil Peñil, Yanira Pereira González, Pablo Pérez Cañadas, Elena Pérez Hoyos, Irene Pérez Pérez, Nuria Perretta Tejedor, Francisco Javier Plaza Zamora, Matilde Prats Gorrochategui, Rosa Prats Mas, Concepción Prieto Vázquez, Elisa Pulgar Feio, Rocío Ramírez Mota, Noa Rey Torres, Xavier Robinat Ros, Estela Rodríguez García, José Antonio Rodríguez Moreno, Ángel Rodríguez Revuelta, Jaime Román Alvarado, Esther Rubio Horcajada, Antonio Mónico Ruiz Lara, Francisca Ruiz Lozano, Raquel San Martín Ursa, Francisco Sánchez Luengo, Navidad Sánchez Marcos, Julio Sánchez-Fuentes Machuca, Eva Sarmiento Alonso, Eduardo Satué de Velasco, Joaquín Sayago Massoni, Isaura Serrano Furelos, Noelia Tejedor García, Javier Teruel Fernández, Maripaz Tornos Maury, Mª Luisa Torres Torres, Marta Tortajada Velert, Martín Túnez Bazterrica, Mª Consuelo Valije Villarías, Juan Carlos Vázquez González, Mª del Pilar Vázquez Mondelo, Isabel Vilar, Macarena Viro Espejo, Matilde Yáñez Jato, Carlota Zaragozá Rabasa, José María Zarauz Céspedes.

REFERENCES

1. García-Maset R, Bover J, Segura de la Morena J, Goicoechea Diezhandino M, Cebollada del Hoyo J, Escalada San Martín J, et al. Documento de información y consenso para la detección y manejo de la enfermedad renal crónica. Nefrología. 2022;42(3):233-64. doi:10.1016/j.nefro.2021.07.010
2. Chronic Kidney Disease Prognosis Consortium; Matsushita K, van der Velde M, Astor BC, Woodward M, Levey AS, de Jong PE, et al. Association of estimated glomerular filtration rate and albuminuria with all-cause and cardiovascular mortality in general population cohorts: a collaborative meta-analysis. Lancet. 2010 Jun 12;375(9731):2073-81. doi:10.1016/S0140-6736(10)60674-5. Epub 2010 May 17. PMID: 20483451; PMCID: PMC3993088.
3. Paciente con insuficiencia renal crónica [Internet] Valencia. Tamarit Antequera E. 30/11/2023 [last access 15/03/2024]. La enfermedad renal crónica sigue creciendo de forma progresiva en España: Casi 67.000 personas están ya en diálisis o trasplantadas. Available at: http://pacienterenal.general-valencia.san.gva.es/2023/12/01/la-enfermedad-renal-cronica-sigue-creciendo-de-forma-progresiva-en-espana-casi-67-000-personas-estan-ya-en-dialisis-o-trasplantadas/
4. Webster AC, Nagler EV, Morton RL, Masson P. Chronic KidneyDisease. Lancet. 2017;389(10075):1238–5. doi:10.1016/S0140-6736(16)32064-5
5. Gheewala PA, Peterson GM, Zaidi STR, Jose MD, Castelino RL. Evaluation of a chronic kidney disease risk assessment service in community pharmacies. Nephrology (Carlton). 2019 Mar;24(3):301-7. doi:10.1111/nep.13247. PMID: 29493051.
6. Donovan J, Al Hamarneh YN, Bajorek B, Papastergiou J, Tsuyuki RT. Community pharmacist identification of chronic kidney disease using point-of-care technology: A pilot study. Can Pharm J (Ott). 2020 Feb 13;153(2):84-7. doi:10.1177/1715163520902495. PMID: 32206152; PMCID: PMC7079322.
7. Al Hamarneh YN, Hemmelgarn B, Curtis C, Balint C, Jones CA, Tsuyuki RT. Community pharmacist targeted screening for chronic kidney disease. Can Pharm J (Ott). 2016 Jan;149(1):13-7. doi:10.1177/1715163515618421. PMID: 26798373; PMCID: PMC4713893.
8. Papastergiou J, Donnelly M, Li W, Sindelar RD, van den Bemt B. Community Pharmacy-Based eGFR Screening for Early Detection of CKD in High Risk Patients. Can J Kidney Health Dis. 2020 May 18;7. doi:10.1177/2054358120922617
9. Belaiche S, Mercier E, Cuny D, Kambia N, Wierre P, Bertoux É, Mascaut D, Azar R, Bataille P, Bourdon F, Mac Namara É, Maisonneuve N, Painchart B, Vrigneau L, Noël C, Décaudin B, Glowacki F; Réseau Néphronor. Implication du pharmacien d'officine dans le parcours de soins de la maladie rénale chronique. Nephrol Ther. 2017 April;13(2):87-92. doi:10.1016/j.nephro.2016.06.006
10. Tesfaye W, Krass I, Sud K, et al. Impact of a pharmacy-led screening and intervention in people at risk of or living with chronic kidney disease in a primary care setting: a cluster randomised trial protocol. BMJ Open. 2023;13:e079110. doi:10.1136/bmjopen-2023-079110
11. Escribá-Martí G, Cámara-Ramos I, Climent-Catalá MT, Escudero-Quesada V, Salar-Ibáñez L (2022) Pharmaceutical care program for patients with chronic kidney disease in the community pharmacy: Detection of nephrotoxic drugs and dose adjustment. Viability study. PLoS ONE 17(12): e0278648. doi:10.1371/journal.pone.0278648
12. Llisterri JL, et al. Prevalencia de la enfermedad renal crónica y factores asociados en la población asistida en atención primaria de Espana: resultados del estudio IBERICAN. Med Clin (Barc). 2021 February 26;156(4):157-65. doi:10.1016/j.medcli.2020.03.005
13. Gorostidi M, Sánchez-Martínez M, Ruilope LM, Graciani A, Juan J, Santamaría R, del Pino MD, Guallar-Castillón P, de Álvaro F, Rodríguez-Artalejo F, Banegas JR. Prevalencia de enfermedad renal crónica en España: impacto de la acumulación de factores de riesgo cardiovascular. Nefrología. 2018 Nov 1;38(6):606-15. doi:10.1016/j.nefro.2018.04.004
14. Consejo General de Colegios Oficiales de Farmacéuticos. Estadísticas de Colegiados y Farmacias Comunitarias 2020 (consultado en Noviembre de 2022). Available at: https://www.farmaceuticos.com/wp-content/uploads/2021/09/Estadisticas-Colegiados-y-Farmacias-2020.pdf

15. Espejo J, McGouh L, Cámara I, Escribá G, Climent MT. Validación del medidor de creatinina sanguínea Nova StatSensor Xpress® en una farmacia comunitaria. Farm Comunitarios. 2020 Jul 22;12(3):14-20. doi:10.33620/FC.2173-9218.(2020/Vol12).003.03
16. SEFAC eXPERT – Plataforma Digital de Gestión de Pacientes. [Internet] Madrid. Sociedad Española de Farmacia Clínica, Familiar y Comunitaria. Last access 19/02/2024. Available at: https://www.sefacexpert.org/
17. Pecoits-Filho R, Ribeiro de Castro MC, Cebrian A, Santamaria R, Lim K-S, Wittbrodt E, Barone S, Arnold M, Tangri N. #3667 Reveal-Ckd: Prevalence of Undiagnosed Stage 3 Chronic Kidney Disease in Australia, Brazil, Canada and Spain. ephrol Dial Transplant. 2023 June;38(Suppl 1):gfad063c_3667. doi:10.1093/ndt/gfad063c_3667
18. Delanaye P, Jager KJ, Bökenkamp A, Christensson A, Dubourg L, Eriksen BO, Gaillard F, Gambaro G, van der Giet M, Glassock RJ, Indridason OS, van Londen M, Mariat C, Melsom T, Moranne O, Nordin G, Palsson R, Pottel H, Rule AD, Schaeffner E, Taal MW, White C, Grubb A, van den Brand JAJG. CKD: A Call for an Age-Adapted Definition. J Am Soc Nephrol. 2019 Oct;30(10):1785-805. doi:10.1681/ASN.2019030238. Epub 2019 Sep 10. PMID: 31506289; PMCID: PMC6779354.

Editor: © SEFAC. Sociedad Española de Farmacia Clínica, Familiar y Comunitaria.

Appendix 1. Patient information sheet

PATIENT INFORMATION SHEET ON CHRONIC KIDNEY DISEASE[1,2]

What is chronic kidney disease (CKD)?
Chronic kidney disease (CKD) is a pathology that presents long term kidney problems in which the kidneys are permanently damaged and do not work as they should. CKD is a public health problem that impacts more than 10% of the Spanish population. If left untreated, CKD can gradually worsen until your kidneys no longer work.

What function do the kidneys have?
The kidneys' main function is cleaning the blood by disposing of waste and producing urine. They also regulate blood pressure and excess fluid and salts in the body.

What can lead to CKD?
When the kidneys do not work correctly, they leave waste in the blood. This waste can build up and lead to toxicity. This can cause problems in your heart, increase bone loss with a risk of fractures and anaemia. If the disease progresses the only option is dialysis or kidney transplant.

How do I know if I have CKD?
Only your doctor can tell you this. However, there are tests that can alert us. A simple blood test tells us our Glomerular Filtration, which is the amount of blood that the kidneys filter in one minute. Another option is a urine analysis searching for albumin; a substance that should not appear in the urine. But these are only signs. Your doctor is the only person who can make a diagnosis.

Who should be offered these tests?
These tests are worth performing in people aged over 60 or who suffer from the following diseases: diabetes, hypertension, cardiovascular disease, structural abnormality of the renal system, existence of kidney stones or enlarged prostate, systemic erythematous lupus, family history of CKD or a hereditary renal disease, blood or proteins in the urine of unknown cause.

What are the symptoms of CKD?
CKD in its initial stages is free of symptoms. You can feel perfectly well although your kidneys have already started to reduce their function. Only in the end stages can loss of appetite, weight change, nausea, feet and ankle swelling, dry skin and itching appear.

What life advice can you follow?
As in everything, a healthy life is the most recommendable. Not smoking, performing regular exercise and staying the correct weight. If for any reason your kidneys start to deteriorate then to avoid the disease progressing, you should adhere to a strict diet and avoid certain medicines. It is also very important to monitor your blood pressure and diabetes as both these diseases contribute to kidney damage.

1. García-Maset R, et al. Documento de información y consenso para la detección y manejo de la enfermedad renal crónica. Nefrologia. May–June 2022;42(3):233-64. doi:10.1016/j.nefro.2021.07.010
2. Grupo de trabajo de la Guía de Práctica Clínica sobre la Detección y el Manejo de la Enfermedad Renal Crónica. Guía de Práctica Clínica sobre la Detección y el Manejo de la Enfermedad Renal Crónica. Ministerio de Sanidad, Servicios Sociales e Igualdad. Instituto Aragonés de Ciencias de la Salud; 2016. Guías de Práctica Clínica en el SNS. Available at: https://portal.guiasalud.es/wp-content/uploads/2018/12/GPC_559_ERC_IACS_compl.pdf

RETURN

Appendix 2. Provincial distribution of the pharmacies and patients taking part

	Pharmacies			Patients		
Province	**n**	**%**	**cumulative %**	**n**	**%**	**cumulative %**
Madrid	19	13.5%	13.5%	267	12.6%	12.6%
Sevilla	11	7.8%	21.3%	122	5.8%	18.4%
Alicante/Alacant	9	6.4%	27.7%	149	7.0%	25.4%
Murcia	9	6.4%	34.0%	153	7.2%	32.7%
Barcelona	9	6.4%	40.4%	162	7.7%	40.3%
Valencia/València	8	5.7%	46.1%	114	5.4%	45.7%
Zaragoza	7	5.0%	51.1%	93	4.4%	50.1%
Cantabria	6	4.3%	55.3%	101	4.8%	54.9%
Asturias	5	3.5%	58.9%	98	4.6%	59.5%
Navarra	5	3.5%	62.4%	86	4.1%	63.6%
Córdoba	4	2.8%	65.2%	59	2.8%	66.4%
Bizkaia	4	2.8%	68.1%	50	2.4%	68.7%
Las Palmas	3	2.1%	70.2%	62	2.9%	71.6%
Huelva	3	2.1%	72.3%	15	0.7%	72.4%
Almería	3	2.1%	74.5%	77	3.6%	76.0%
Illes Balears	3	2.1%	76.6%	30	1.4%	77.4%
A Coruña	3	2.1%	78.7%	53	2.5%	79.9%
Huesca	2	1.4%	80.1%	26	1.2%	81.1%
Albacete	2	1.4%	81.6%	51	2.4%	83.6%
Cuenca	2	1.4%	83.0%	41	1.9%	85.5%
Lugo	2	1.4%	84.4%	22	1.0%	86.5%
Tarragona	2	1.4%	85.8%	49	2.3%	88.8%
León	2	1.4%	87.2%	40	1.9%	90.7%
La Rioja	2	1.4%	88.7%	33	1.6%	92.3%
Ciudad Real	1	0.7%	89.4%	15	0.7%	93.0%
Zamora	1	0.7%	90.1%	9	0.4%	93.4%
Valladolid	1	0.7%	90.8%	1	0.0%	93.5%
Toledo	1	0.7%	91.5%	7	0.3%	93.8%
Teruel	1	0.7%	92.2%	8	0.4%	94.2%
Ávila	1	0.7%	92.9%	20	0.9%	95.1%
Soria	1	0.7%	93.6%	4	0.2%	95.3%
Segovia	1	0.7%	94.3%	7	0.3%	95.7%
Santa Cruz de Tenerife	1	0.7%	95.0%	11	0.5%	96.2%
Salamanca	1	0.7%	95.7%	12	0.6%	96.7%
Granada	1	0.7%	96.5%	10	0.5%	97.2%
Guadalajara	1	0.7%	97.2%	3	0.1%	97.4%
Pontevedra	1	0.7%	97.9%	9	0.4%	97.8%
Palencia	1	0.7%	98.6%	6	0.3%	98.1%
Lleida	1	0.7%	99.3%	21	1.0%	99.1%
Cádiz	1	0.7%	100.0%	20	0.9%	100.0%
Total	**141**			**2116**		

RETURN