

Comparative Analysis of Chronic Kidney Disease Diagnosis and Management in Spain and Portugal: A Cross-Sectional Survey of Healthcare Professionals

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Abstract

Background: Chronic Kidney Disease (CKD) is a major global health burden, frequently underdiagnosed in early stages. Differences in healthcare systems may influence diagnostic and management pathways. This study compares CKD practices between Spain and Portugal.

Methods: A cross-sectional survey was conducted among primary care physicians and nephrology professionals in Spain and Portugal. Qualitative responses were analyzed thematically and complemented with descriptive statistics.

Results: Both countries reported substantial barriers to early CKD diagnosis. Training gaps were reported by 70% of respondents in Spain and 75% in Portugal, while communication barriers affected 65% and 70%, respectively. Late referral patterns were common in both settings. Portugal showed consistently higher perceived barriers across all domains.

Conclusions: CKD management challenges are shared across both countries but appear more pronounced in Portugal. Strengthening primary care training, improving digital integration, and implementing early detection strategies are critical to improving outcomes.

Keywords: Chronic Kidney Disease, Primary Care, Nephrology, Early Diagnosis, Health Systems, Spain; Portugal, Digital Health

1. Introduction

Chronic Kidney Disease (CKD) affects approximately 10–15% of the adult population worldwide and is associated with increased cardiovascular morbidity and mortality [1-3]. Early diagnosis and intervention are critical to slowing disease progression; however, CKD remains underdiagnosed, particularly in primary care settings [4-6].

Southern European countries, including Spain and Portugal, share similar healthcare models but differ in organization and resource allocation. Portugal has one of the highest rates of end-stage renal disease (ESRD) in Europe, suggesting potential inefficiencies in

early detection and management [7-9].

CKD is a very important public health problem directly related to climate change and causing serious burden to the sustainability of environment and health system as well [10].

The most common renal replacement therapy (RRT), hemodialysis (HD) and peritoneal dialysis (PD) practices generate a considerable environmental footprint, and kidney health is particularly sensible to the effects of climate change [9-10].

Due to the way that the human increases the demand for food,

fresh water, carburant, industry, and so forth during the last 50 years the world is facing a large and irreversible loss of diversity of ecosystem on the earth. There is the need to adopt a sustainable process in Renal Care based on CKD prevention and sustainable RRT [11-13].

The focus of this article is to collect and analyze the opinion of health care professionals (HCP) about measures that can be taken to implement effective CKD prevention.

This study aims to provide a comparative analysis of CKD diagnosis and management practices between Spain and Portugal, identifying shared and country-specific barriers.

2. Materials and Methods

Between June and December 2024, we performed an online survey to collect the sensibility of primary care clinicians, renal nurses and nephrologists, concerning the major current challenges in kidney patients care: CKD prevention and Environmental sustainability practices.

The questionnaires were regarding key areas of CKD prevention and environmental sustainability practices during the dialysis processes, considering the CKD screening, the management of patients at risk, recommendations from kidney disease: improving global outcomes (KIDGO) and European Kidney Health Alliance (EKTA) about CKD prevention, the adoption of measures to reduce Carbon footprint, water usage, energy efficiency and consumption, waste management and recycling program.

2.1 Study Design

A cross-sectional survey was conducted among healthcare professionals, including:

- Primary care physicians
- Nephrologists
- Renal nurses

2.2 Ethical Considerations

The study was approved by the Ethics Committee of the Universidad Politécnica de Madrid, ensuring compliance with general data protection Rregulation (GDPR) regulations and ethical research standards.

2.3 Data Analysis

- Qualitative responses → thematic analysis
- Quantitative data → descriptive statistics (%)
- Comparative analysis between Spain and Portugal

3. Results

The survey was completed by 29 HCPs from renal care units and primary care center across Portugal and Spain.

From the 29 full responses received, 14 were from HCPs from Portugal and 15 from Spanish healthcare professional.

3.1 Participant Characteristics

Table 1 shows the respondent characteristics

Variable	Spain (%)	Portugal (%)
Primary Care Physicians	60	62
Nephrologists	40	38
>10 years experience	55	58
Urban practice	70	68

Table 1: Participant Characteristics

3.2 Key Barriers to CKD Diagnosis

Table 2 shows the barriers facing during CKD management, and

table 3 shows the comparison between the barriers revealed in both countries.

Barrier	Spain (%)	Portugal (%)
Lack of training	70	75
Communication issues	65	70
Late referral	55	60
Limited lab access	50	55

Table 2: Key Barriers in CKD Management

Barrier	Spain (%)	Portugal (%)
Training Gap	70	75
Communication	65	70
Late Referral	55	60
Lab Access	50	55

Table 3: Comparative Barriers (%)

3.3 Diagnostic Challenges

Respondents in both countries reported:

- Limited use of albuminuria testing
- Delayed access to laboratory results
- Insufficient decision-support tools

Portuguese respondents more frequently emphasized lack of preparedness in primary care, consistent with qualitative findings.

3.4 Referral Patterns

Referral decisions were primarily based on:

- Decline in estimated glomerular filtration rate (eGFR)
- Elevated creatinine

This indicates a late referral trend, associated with poorer clinical outcomes [14-16].

3.5 Communication Between Care Levels

Both countries reported:

- Fragmented Information and communication technology ICT systems
 - Limited direct communication
 - Reliance on patients for information transfer
- Portugal reported slightly greater communication challenges [17-20].

3.6 Improvement Strategies

Common recommendations included:

- Early screening programs
- Multidisciplinary care
- Patient education
- Integration of digital tools

Figure 1 shows the comparison of key barriers between Spain and Portugal, showing higher prevalence in Portugal across all domains [21-25].

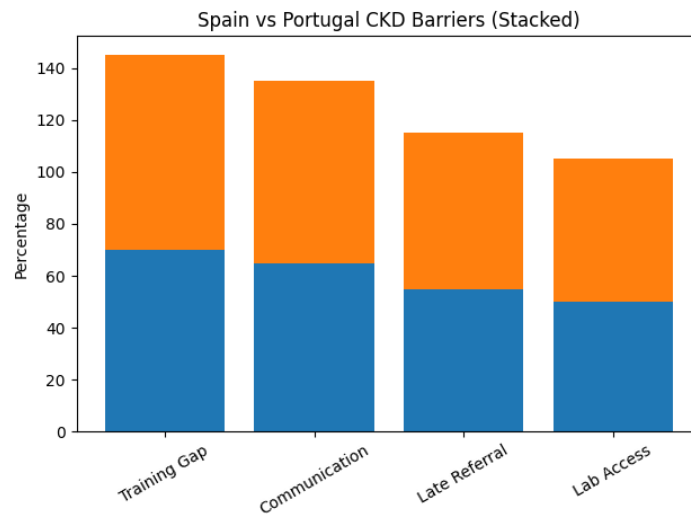


Figure 1. Comparative Barriers in CKD Management

4. Discussion

To answer the question about the challenges to coordinate the kidney patient management between several services the Spanish and Portuguese HCPs pointed to the same problem: the need of better training about kidney care for HCP in Primary Care. In addition, the Spanish and Portuguese HCPs, consider that the current tool available to support kidney disease prevention is the Patient education to be aware about their own lifestyle and medication.

4.1 Shared Challenges

Both Spain and Portugal demonstrate:

- Delayed CKD diagnosis
- Insufficient primary care training
- Poor coordination between care levels

These findings align with global evidence on CKD care gaps [15].

4.2 Differences Between Countries

Portugal shows:

- Higher perceived barriers
 - Greater diagnostic delays
- Spain shows:
- Slightly better access to diagnostics
 - But persistent structural fragmentation

4.3 Role of Digital Health

Integrated electronic health records and decision-support tools could:

- Improve early detection
- Enhance communication
- Reduce delays in referral [14,15,16].

4.4 Clinical Implications

Improving CKD care requires:

- Strengthening primary care
- Standardizing referral pathways
- Enhancing multidisciplinary collaboration [28-30].

5. Limitations

- Survey-based design
- Limited sample size
- Self-reported data

6. Conclusions

The results of this survey show that the implementation of prevention and sustainability policies can improve renal healthcare and patient outcomes.

Enhancing care to prevent the progression of disease, adopting telehealth, and focusing on exhaustive screening of patients and risk delaying or even avoiding advanced stages can reduce significant environmental impacts associated with CKD, including those from dialysis, hospital stays, and patient travel. The study highlights the need to evaluate environmental effects across full care pathways and calls for better prevention and the adoption of eco-friendly practices in nephrology units because respondents are not aware about the implemented measures to avoid or reduce environmental factors.

CKD diagnosis and management remain suboptimal in both Spain and Portugal. While challenges are shared, Portugal exhibits greater systemic barriers. Addressing these gaps requires coordinated efforts in training, digital integration, and early detection strategies.

Comparison of key barriers between Spain and Portugal, showing higher prevalence in Portugal across all domains.

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Conflict of Interest Statement / Disclosure Statement

The author(s) declared that there is no potential conflict of interest concerning the research, authorship, and/or publication of this article.

Ethics approval and consent to participate

Despite the participant having to answer the first and mandatory question about consent to participate, we get the Ethical approval from Ethic Committee of Universidad Politécnica de Madrid. (See the supplemental Material).

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Consent for publication / Informed consent

Consent was asked of all participants before starting to answer the questionnaire.

Author contributions

Abel Mata-Lima conceived and conducted the study. José Javier Serrano-Olmedo reviewed and edited the manuscript and approved the final version of the manuscript. Abel Mata-Lima conceptualized and developed the questionnaires and wrote the first draft of the manuscript. Abel Mata-Lima and José Javier Serrano-Olmedo undertook the survey review, distribution, and diffusion. J.J. Serrano provided project guidance and ethical approval management. Abel Mata-Lima and José Javier Serrano-Olmedo undertook the questionnaire and manuscript review and informed the interpretation of findings. All authors contributed significantly to the study design. Material preparation, data collection, and analysis were performed by all authors. All authors commented on previous versions of the manuscript, read and approved the final manuscript;

Abel Mata-Lima verifies the data used in these analyses. All authors confirm they had full access to all the data in the study and accept responsibility to submit for publication.

Supplementary Material

The ethical approval – confidential

This article contains the following online survey questionnaires:
<https://docs.google.com/forms/d/13b1kcaEBciRjHjzPjZGSF17vQ3fR3MCfbp1MEVKEBnU/edit?pli=1>
<https://docs.google.com/forms/d/1Owc81qpVVaPSsJBCEGonW9UDC2Plu4DOyzR2zNSjCh0/edit>
https://docs.google.com/forms/d/1auW31D99gzAgAcBcf07AIQvndz61TQUNzTeW_1_zbA/edit

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