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Budgetary impact of increasing use of peritoneal dialysis over haemodialysis in Spain

Gemma Barbado[1], Carla Garí[2*], Asís Ariznavarreta[2], Neus Vidal-Vilar[2] and Carlos Alvarez[3]

Abstract

Background Chronic kidney disease (CKD) represents a significant public health concern, due to its high prevalence and incidence, as well as its substantial socio-economic costs. In Spain, estimates suggest that the direct healthcare costs of CKD will increase by 13.8% from 2022, which is why the cost of kidney replacement treatment (KRT) programs efficiency and sustainability is under constant analysis. Our analysis aimed to estimate the cost associated with peritoneal dialysis (PD) compared to hemodialysis (HD) from the Spanish National Health System (NHS) perspective and to evaluate the budgetary impact of an increase in the use of PD in our healthcare system environment.

Methods The number of patients eligible for KRT was calculated based on the total Spanish population and the incidence and prevalence of patients with end-stage renal disease (ESRD). Patients receiving each modality, type of dialysis, and location of dialysis were estimated. The annual costs of each dialysis modality were calculated and included the cost of dialysis sessions and additional costs (including the cost of peritoneal and vascular access, hospitalisation costs due to potential complications of dialysis, cost of health care personnel, and cost of health care transport used by patients). Population data and costs (€, 2024) were obtained from the Spanish databases and a nephrologist validated the assumptions. Budget impact analysis assessed the incremental budget impact between the current scenario and the alternative scenario, where 30% of incident patients on scheduled HD would receive PD.

Results We estimated that in Spain, there are 27,281 prevalent dialysis patients (3,141 receiving PD and 24,140 receiving HD/HDF) and 6,052 incident dialysis patients (1,173 receiving PD and 4,879 HD/HDF). The cost of dialysis amount to €1,555,573,771 (€141,361,374 PD and €1,414,212,397 to HD) in the current scenarios and to €1,540,584,011 (€167,593,157 PD and €1,372,990,854 HD) in the alternative scenario, resulting in a saving of €14,989,760 when 30% of the patients scheduled to receive HD would instead receive PD during the first year.

Conclusions The increased use of PD in Spain improves the system's efficiency, generating significant savings in the treatment of ESRD patients from the NHS perspective.

Keywords Dialysis, Kidney replacement treatment, Peritoneal dialysis, Hemodialysis, Costs, Budget impact

*Correspondence:
Carla Garí
cgari@outcomes10.com
[1]Associate Director Government Affairs and Market Access Spain and Portugal, Baxter S.L., Madrid, Spain
[2]Outcomes´10 (a ProductLife Group Company), Castellón, Spain
[3]Associate Medical Director Renal Baxter Europe, Baxter S.L., Madrid, Spain

Background

End-stage renal disease (ESRD) is diagnosed when kidney function is no longer adequate for long-term survival without kidney replacement treatment (KRT) [1] and is a prevalent condition worldwide [2]. In Spain, the number of new patients requiring KRT has risen by 24.5%, from 120 persons per million population in 2011 to 149.5 in 2021, and its prevalence has grown more than 30% in the last decade, reaching 1,387 per million population, standing at 65,740 people in 2021 [3]. Although these patients represent barely 0.1% of the population, the cost of KRT in Spain represents almost 3% of public health expenditure and 4% of specialised care expenditure [3].

In Spain, where the National Health System (NHS) pays for the totality of the costs of the ESRD treatment, estimations suggest that direct healthcare costs of chronic kidney disease (CKD) will increase by 13.8% from 2022 onwards, reaching 4.89 billion euros in 2027. Of this, 42.5% will correspond to the cost of KRT, even though they represent less than 4% of diagnosed CKD patients [4].

KRT options include kidney transplantation (KT), hemodialysis (HD), and peritoneal dialysis (PD). KT is considered the gold standard due to its survival, health-related quality of life and cost-effectiveness [5, 6]. However, due to the limited number of donors, dialysis (PD or HD) is necessary for the survival of patients while awaiting KT or for those who are not candidates for KT [7].

HD is an extracorporeal blood purification procedure in which a machine replaces the kidney's main functions: removing substances and fluids and regulating acid-base balance. This treatment takes an average of 4 h and must be carried out thrice weekly in a healthcare centre, although technological advances mean that nowadays, more patients can receive HD at home [8]. In PD, the blood is cleansed through the peritoneum, with the dialysis fluid being introduced into the abdominal cavity through a pre-implanted catheter. After the exchange of substances, the used fluid is removed with the waste products. PD can be performed manually (patients perform an average of 3 to 5 exchanges per day, depending on their needs) or automatically, where exchanges are performed at night by a machine [8].

Although HD and PD both offer very similar long-term survival outcomes, these appear to be better with PD in the early years (most likely related to better preservation of residual renal function) [9, 10]. Additionally, higher costs have been previously reported in the literature for HD compared to PD, mainly due to the cost of the healthcare staff involved in the HD process [7], which in Spain is usually done at the hospital or in a contracted out-patient HD-center (CHDC).

The use of PD is far from reaching the desired figures in our country, although 30–40% of ESRD patients could receive PD [7]. In Spain, hemodialysis is currently the most widely used initiated modality (78.7% of patients), followed by peritoneal dialysis (16.8%) and early KT (4.5%) [3]. Compared to other European countries, Spain ranks ninth in terms of the percentage of patients receiving PD, a list topped by countries such as Sweden, Denmark and Norway, with 34%, 32%, and 29% of patients receiving PD, respectively [11].

The objective of our study is to estimate the cost associated with PD compared to HD from the NHS perspective and to evaluate the budgetary impact of an increase in the use of PD in our healthcare system environment to help make decision-making.

Methods

To better understand the budgetary impact of an increase in the use of PD in Spain, a cost estimate was made using Excel, where the costs associated with the use of PD and HD were calculated, as shown in Fig. 1. This study adheres to the standards recommended in the Consolidated Standards for Health Economic Assessment Reporting CHEERS [12].

Structure

The analysis estimated the cost of treating ESRD patients for one year in Spain, including the different modalities of PD and HD. Regarding PD, it is considered both automated peritoneal dialysis (APD) and continuous ambulatory peritoneal dialysis (CAPD). For HD, online hemodiafiltration (HDF) was also considered, distinguishing whether they are performed in a hospital, in a CHDC or at home. A nephrologist validated all relevant data input parameters and scenario assumptions made in the analysis.

Population

Based on the total Spanish population [13] and the incidence and prevalence of patients with ESRD in our country [11], the number of patients eligible for KRT in Spain was calculated. According to the ERA-EDTA Registry Annual Report 2021 [11], in Spain, 55.6% of prevalent patients received KT, and 44.4% were on dialysis (5.1% on PD [67.1% on CAPD; 32.9% on APD], 35.2% on HD, and 4.1% on HDF). Also, 4.1% of incident patients received KT, and 95.9% were on dialysis (18.6% on PD, 73.0% on HD and 4.3% on HDF), percentages obtained from the mean of the different Spanish Autonomous Communities for each available modality. To determine how many of these patients started dialysis on a scheduled basis, data published by Arrieta et al. [6] were used, and the percentage of scheduled HDF dialysis was assumed to be the same as for HD.

In the case of HD and HDF, the location where it was received was also considered (at home, in the hospital or

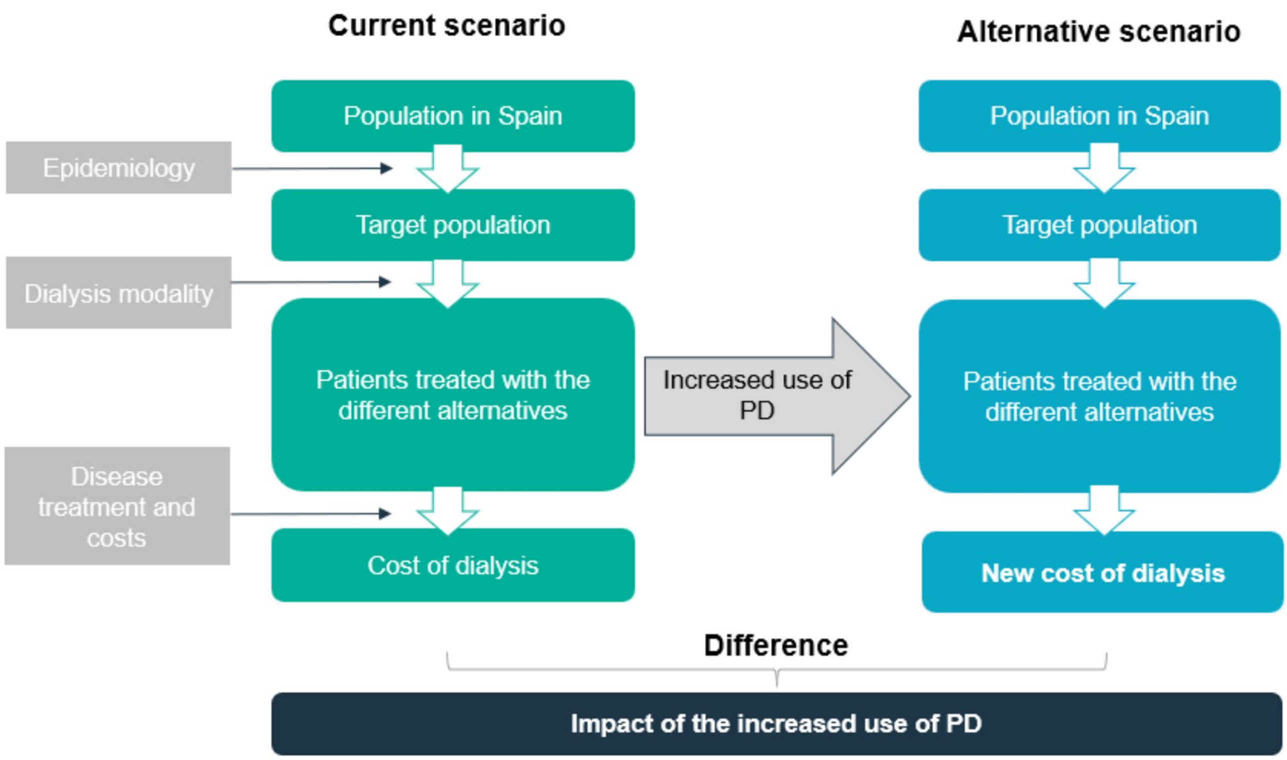

Fig. 1 Description of the analysis

in a CHDC), differentiating between prevalent and incident populations, and assumed to be the same for both modalities [14] (Table 1).

Costs

Costs (€, 2024) were obtained from the Spanish databases (eSalud for resources and *Consejo General de Colegios Oficiales de Farmacéuticos* for pharmacological costs) [15, 16], and a nephrologist validated the frequency of sessions.

For estimation of the annual cost of each dialysis modality, the cost of dialysis sessions and additional costs (including cost of peritoneal and vascular access, hospitalisation cost due to potential complications of dialysis, cost of health care personnel, and cost of health care transport used by patients) were considered.

The cost of dialysis sessions included the cost per session, the cost of the supplements administered, the cost of patient training in the case of home administration, and the pharmacological costs (Table 2).

Seven sessions per week were considered for CAPD and APD, of which 60% of patients were on low-volume APD and 40% on high-volume APD. Low-volume APD is defined using a low-volume cycler, with a capacity of less than 15 L per day. Conversely, high-volume APD is defined as using a high-volume cycler, with a capacity exceeding 15 L per day.

For HD and HDF, five sessions per week were considered when administered at home and three sessions per week when administered in a hospital or a CHDC. The analysis assumed that 60% of CAPD and APD patients receive icodextrin, and 40% receive sodium bicarbonate during the dialysis sessions [6].

In addition, the home HD and PD therapies require initial supervision to learn the process. Costs associated with this training process for incident patients were included in the analysis [15], considering 7 sessions per patient for PD and a learning period of 2 months (24 sessions) for HD [6, 17].

Finally, the annual pharmacological costs derived from using erythropoietic agents were considered in 39% of PD patients and 57% of HD and HDF patients [6].

Regarding additional costs, peritoneal and vascular access was considered to collect the cost of first access to treatment [15]. Puncture was considered in 94.3% of PD patients and laparoscopy in 5,7% [7]. For scheduled HD and HDF, a tunnelled hemodialysis catheter was considered in 39.9% of patients and an arteriovenous fistula in 60.1% [20]. Non-tunnelled hemodialysis catheter was assumed for all non-scheduled HD and HDF patients.

The cost of hospitalisation for potential dialysis complications was considered and calculated based on the average annual days of hospitalisation per each dialysis modality. Five days were considered for PD and 7.2 days for HD and HDF [21].

Table 1 Population estimates

	Prevalent patients		Incident patients	
	Data	**Estimated population**	**Data**	**Estimated population**
Spanish population	48 186 421			
ESRD *[11], patients per million population*	1 275	**61 443**	130.93	**6 309**
KT *[11], %*	55.6%	34 161	4.1%*	257
PD *[11]*	5.1%	**3 141**	18.6%*	**1 173**
Scheduled PD *[6], %*	-	-	95.0%	1 115
CAPD *[11], %*	67.1%	2 107	72.2%	847
APD *[11], %*	32.9%	1 034	27.8%	326
HD *[11], %*	35.2%	**21 637**	73.0%*	**4 608**
Scheduled HD *[6], %*	-	-	53.0%	2 442
HD received at home *[14], %*	1.5%	316	0.7%*	33
HD received at hospital *[14], %*	43.6%	9 436	43.9%*	2 025
HD received at CHDC *[14], %*	54.9%	11 885	55.3%*	2 550
HDF *[11], %*	4.1%	**2 503**	4.3%*	**271**
Scheduled HDF**, %	-	-	53.0%	144
HDF received at home** *, %*	1.5%	37	0.7%	2
HDF received at hospital** *, %*	43.6%	1 092	43.9%	119
HDF received at CHDC**, %	54.9%	1 375	55.3%	150

* Average of the available distribution data from the different Spanish autonomous communities by modality and dialysis site for incident patients; ** assumed to be the same as for HD; ESRD: End-stage renal disease; KT: Kidney transplantation; PD: peritoneal dialysis; CAPD: continuous ambulatory peritoneal dialysis; APD: automated peritoneal dialysis; HD: hemodialysis; HDF: online hemodiafiltration; CHDC: contracted out-patient hemodialysis centre

Table 2 Cost of dialysis sessions

	Frequency/ % of use	Cost[15]
PD sessions		
CAPD, weekly frequency	7.0	€52.35/day
APD, weekly frequency	7.0	€72.27/day*
Low-volume APD, % patients	60.0%	€65.88/day
High-volume APD, % patients	40.0%	€81.87/day
HD sessions		
HD received at home, weekly frequency	5.0	€140.90/day
HD received at hospital, weekly frequency	3.0	€252.27/day
HD received at CHDC, weekly frequency	3.0	€123.91/day
HDF sessions		
HDF received at home, weekly frequency	5.0	€162.04/day
HDF received at hospital, weekly frequency	3.0	€290.11/day
HDF received at CHDC, weekly frequency	3.0	€142.49/day
CAPD and APD supplements		
Icodextrin [6], % patients	60%	€7.1
Sodium bicarbonate [6], % patients	40%	€14.0
Training		
PD [6], sessions per patient	7.0	€146.3
HD [17], sessions per patient	24.0	€252.3
Pharmacological costs derived from the use of erythropoietic agents		
PD [6], % patients	39.0	€1 327.6**[16]
HD [6], % patients	57.0	€2 540.3**[16]

*weighted cost of Low-volume APD (60%) and High-volume APD (40%); **annual cost: Binocrit® treatment, with indication for HD and PD, has been considered [18]. The posology considered is 119.40 U/kg/week in HD and 62.40 U/kg/week in PD [6], assuming a mean weight of 70 kg [19]; PD: peritoneal dialysis; CAPD: continuous ambulatory peritoneal dialysis; APD: automated peritoneal dialysis; HD: hemodialysis; HDF: hemodiafiltration; CHDC: contracted out-patient hemodialysis centre

Healthcare personnel costs were calculated according to the standards and recommendations of the Spanish Ministry of Health for an extrarenal dialysis unit [14]. Based on these, in the case of PD, one nephrologist per 100 patients, one nurse per 20 patients and two auxiliary nurses per 3 nurses were considered, giving a total of 43 nephrologists, 216 nurses and 144 auxiliary nurses. For HD and HDF, 1 nephrologist was considered for every 100 patients, 1 nurse for every 4.5 patients and 1 nurse auxiliary for every 5 nurses, giving a total of 290 nephrologists, 6,449 nurses and 1,290 nurse auxiliaries. The monthly cost of each of these healthcare professionals was obtained from their average salary in each Autonomous Community [22–32].

Finally, the cost of medical transport used by patients receiving HD in the hospital or the CHDC was included and calculated from its daily cost [15] (Table 3).

Costs associated with the loss of patient productivity were included in an additional scenario to understand the impact from a societal perspective. It was based on the percentage of working-age patients (40.1% for PD and HD) [11], considering patients who are in active employment (37.6% for PD; 20.4% for HD and HDF) [33], and the average annual salary (€25,896.82) [34], assuming that the inactivity of patients of working age was due to illness.

Budget impact analysis: base case and additional scenarios

Budget impact analysis assessed the incremental budget impact between the current scenario (current percentage of use of HD and PD in Spain) and the alternative

Table 3 Additional costs

	PD	HD/HDF	Cost[15]
Peritoneal and vascular access			
Punction, % of use	94.3%		€762.5
Laparoscopy, % of use	5.7%		
Tunnelled catheter, % of use	-	39.9% of scheduled patients	€1 063.3
Arteriovenous fistula, % of use	-	60.1% of scheduled patients	€804.3
Non-tunnelled catheter, % of use	-	100,0% of non-scheduled patients	€979.4
Hospitalisation for potential dialysis complications			
Hospitalisation days, mean	5	7.2	€868.7 /day
Healthcare personnel			
Nephrologist, n	43	290	€3 797.89*
Nurse, n	216	6 449	€2 254.62*
Auxiliary nurse, n	144	1 290	€1 471.01*
Medical transport			
Medical transport	-	100%	€27.95 /day

* cost obtained from average salaries in each Spanish Autonomous Communities [22–32]; PD: peritoneal dialysis; HD: hemodialysis; HDF: hemodiafiltration

scenario, where 30% of incident patients on scheduled HD would receive PD. From a payer's perspective, budget impact calculations were performed over a 1-year time horizon, considered appropriate in the absence of potential changes in treatment and mortality associated with the pathology. Therefore, discounting would not be applicable.

Two additional scenarios were set: one considered that 30% of all incident HD patients would receive PD, and a second scenario assessed the impact from a societal perspective, including the costs associated with the loss of patient productivity.

Results

The population estimate made by the model indicates that in Spain, there are 27,281 prevalent dialysis patients (3,141 receiving PD and 24,140 receiving HD/HDF) and 6,052 incident dialysis patients (1,173 receiving PD and 4,879 HD/HDF).

In the current scenario, the cost of dialysis amounts to €1,555,573,771, of which €141,361,374 correspond to PD patients and €1,414,212,397 to HD/HDF patients. In the alternative scenario, the total cost is €1,540,584,011, of which €167,593,157 corresponds to PD patients and €1,372,990,854 to HD/HDF. This results in a saving of €14,989,760 when 30% of the patients scheduled to receive HD would instead receive PD during the first year.

Of the total cost savings, 20% represent savings in the cost of dialysis sessions. The remaining 80% represents savings in additional costs, of which 56% comes from savings in transport, 31% from savings in healthcare personnel, 12% from hospitalisation for potential complications, and the remaining 1% from the peritoneal and vascular access cost. Regarding the cost of dialysis sessions, the increased cost of supplements and patient training is offset by savings in session and pharmacological costs. Details of the results are shown in Table 4.

The cost per patient was calculated at €46,667 in the current scenario and €46,218 in the alternative scenario, representing a saving of €450 per patient.

Additionally, Fig. 2 shows the distribution of each cost considered in the total PD and HD/HDF costs. The dialysis session cost accounts for approximately 59% and 65% of the total cost in HD and PD, respectively, while hospitalisation for possible complications accounts for 13% of the total cost for both modalities. The main differences remain in personnel costs (PD: 7%; HD/HDF: 15%), transport costs (PD: 0%; HD/HDF: 10%) and the cost of supplements for PD patients, which account for 11% of the costs.

Additional scenarios

Considering that 30% of all incident HD patients receive PD (a larger number of patients would receive PD), the costs of dialysis would be €1,527,246,632 (€190,834,181 corresponding to PD, and €1,336,412,451 corresponding to HD/HDF). This would result in a saving of €28,327,139 over the current scenario. The cost per patient in the alternative scenario would be €45,818, representing a saving of €850 per patient.

From a societal perspective, the costs associated with the loss of productivity would amount to €333,209,732 in the current scenario and to €331,819,277 in the alternative scenario. Dialysis cost would reach €1,888,783,503 in the current scenario and €1,872,403,289 in the alternative scenario. This results in a saving of €16,380,214 when 30% of the patients scheduled to receive HD would receive PD during the first year. The cost per patient from a societal perspective would be €56,664 and €56,172 in the current and alternative scenario, respectively, representing a saving of €491 per patient.

Table 4 Results of the budgetary impact

	Current scenario			Alternative scenario			BUDGETARY IMPACT
	PD	HD/HDF	TOTAL	PD	HD/HDF	TOTAL	
Cost of dialysis sessions	**€ 111 380 671**	**€ 878 230 154**	**€ 989 610 825**	**€ 131 773 133**	**€ 854 900 686**	**€ 986 673 819**	**€ -2 937 006**
Cost per session	€ 92 400 104	€ 836 002 977	€ 928 403 081	€ 108 801 967	€ 813 829 897	€ 922 631 864	€ -5 771 217
Supplements	€ 15 545 092	€ 0	€ 15 545 092	€ 18 339 782	€ 0	€ 18 339 782	€ 2 794 689
Patient training	€ 1 201 465	€ 208 754	€ 1 410 220	€ 1 995 745	€ 175 562	€ 2 171 307	€ 761 087
Pharmacological costs	€ 2 234 010	€ 42 018 422	€ 44 252 432	€ 2 635 639	€ 40 895 227	€ 43 530 866	€ -721 566
Additional costs	**€ 29 980 703**	**€ 535 982 243**	**€ 565 962 946**	**€ 35 820 025**	**€ 518 090 168**	**€ 553 910 193**	**€ -12 052 753**
Peritoneal and vascular access cost	€ 894 669	€ 4 592 524	€ 5487 193	€ 1 486 128	€ 3 862 313	€ 5 348 441	€ -138 753
Hospitalisation cost due to potential complications	€ 18 740 443	€ 181 495 966	€ 200 236 409	€ 22 109 590	€ 176 644 393	€ 198 753 984	€ -1 482 425
Health care personnel	€ 10 345 592	€ 210 468 425	€ 220 814 016	€ 12 224 306	€ 204 850 119	€ 217 074 426	€ -3 739 590
Health care transport	€ 0	€ 139 425 328	€ 139 425 328	€ 0	€ 132 733 343	€ 132 733 343	€ -6 691 985
TOTAL	**€ 141 361 374**	**€ 1 414 212 397**	**€ 1 555 573 771**	**€ 167 593 157**	**€ 1 372 990 854**	**€ 1 540 584 011**	**€ -14 989 760**

Discussion

The current budget impact analysis was developed to determine the economic consequences of an increase in PD use in patients with ESRD. The Spanish NHS could save almost 15 million euros if 30% of incident patients scheduled for HD receive PD during the first year. This saving would increase to 28 million euros if 30% of all incident patients receive PD instead of HD. Eighty per cent of these savings correspond to the additional costs of the dialysis session itself, which underlines the importance of considering these costs in the decision-making process. In addition to the potential economic savings, it is important to consider the patient's perspective in the decision-making process. A review of the literature concluded that PD is associated with better perceived quality of life, greater autonomy, fewer comorbidities and greater social support in peritoneal dialysis patients [35]. In the case of HD, transport and personnel costs together account for a quarter of the total cost of HD. However, transport costs are reduced to zero in PD and personnel costs account for a smaller percentage (less than half) for HD. From a societal point of view, the cost savings amount to 16 million euros, of which 8% are savings related to the loss of productivity.

To the best of our knowledge, this is the first Spanish study to demonstrate, in budgetary terms, how changing the current distribution of dialysis modalities could potentially reduce the economic burden on the NHS and society's perspective of the ever-increasing demand for dialysis services in Spain.

Our results are in line with those previously published in other settings. In France, it was estimated that a 25% increase in the use of PD would result in savings of €155 million per year (2007, €) [36]. In the UK, where the HD: PD ratio was set at 79:21, a shift over 5 years in dialysis modality use to 30% PD and 70% HD would result in a cumulative national saving on dialysis services of £133 million (2007, £) [37]. In the United States, an increase of 15% in the use of PD would result in potential savings of >$1.1 billion over 5 years (2005, $) [38]. More recently, in Korea, increasing incident PD patients by 20%, 50%, 70%, and 100% (non-diabetic patients under 65) resulted in a 5-year savings ranging from $25 million to $74 million (2018, $) [39].

Several factors have been described as influencing the choice of dialysis modality. These include clinical outcomes, patient comorbidities, good predialysis patient education, patient comfort and home situation, and clinician experience and competence with both modalities [40, 41]. The patient's medical condition is a key factor in the choice of dialysis modality. However, patient preferences should be considered when there is no difference in clinical outcomes between HD and PD. Patient preferences are in turn, influenced by the factors such

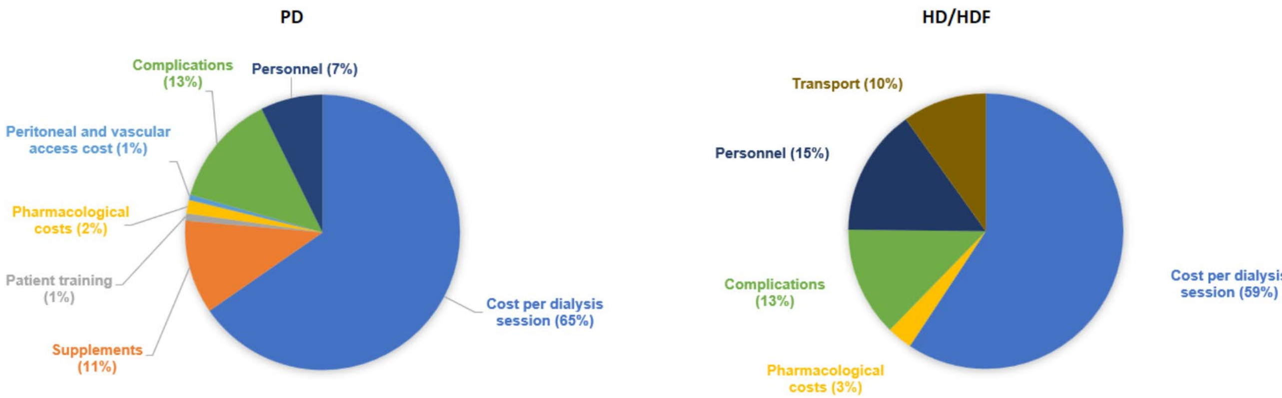

Fig. 2 Cost distribution for PD and HD/HDF

as patient age, physical status, presence of comorbidities and lifestyle [42, 43]. Nephrologists must be able to provide unbiased advice on the advantages and disadvantages of PD versus HD and allow patients to choose their own dialysis regimen. Several studies have shown that over 50% of patients choose PD when nephrologists provide unbiased advice [44]. Factors related to patient-physician interaction are key determinants of PD utilisation [45].

In general, PD offers a better quality of life than HD due to greater autonomy, flexibility, avoidance of regular hospital visits for patients and their families, and the absence of pain from repeated cannulation. PD also preserves residual renal function and vascular access for future dialysis [44]. Moreover, technical innovations in PD have led to a significant reduction in therapy-related complications, allowing patients to remain on PD for a longer period of time [46].

In terms of survival, a progressive increase in 5-year survival for PD patients compared to HD patients has been shown in an analysis of the European Renal Association and European Dialysis and Transplantation Association registry data from 198,076 dialysis patients followed over 20 years [47]. Furthermore, although several studies have shown that PD has better survival than HD in the first and second year of treatment (especially in younger, non-diabetic patients with less comorbidity), a study carried out in our country shows short and medium-term survival advantages over HD regardless of age, diabetes and sex [10]. In addition, a meta-analysis has shown that PD before KT is associated with better patient survival after transplantation than HD before KT [48]. These results suggest that PD may be the preferred dialysis method for patients awaiting KT, an important consideration in our country given the high transplant rates observed in Spanish registers in recent years [11].

The distribution of KRT initiation modalities in Spain varies by Autonomous Community, with PD slightly above 28% in communities such as the Canary Islands and below 6% in others such as Extremadura, with the majority between 10% and 20%. The results of our analysis show that an increase in the percentage of patients receiving PD as an initial modality would mean a saving in the cost of dialysis in our country, which could also mean an improvement in the quality of life and survival of patients.

Our study has several limitations. Firstly, our estimation does not show results at the regional level, which could be a limitation given the differences between the different Autonomous Communities. However, all regional data available in the literature have been considered in calculating the national average. Secondly, our estimate does not consider the transition of patients between dialysis modalities or their mortality. This is due to the time horizon considered. Thirdly, our study assumes that all patients use health transport. This assumption was made in order to standardise the cost of this transport, as in some Autonomous Communities patients who do not use it can claim compensation for transport costs from the NHS. Lastly, our estimate does not include some other costs, such as the cost of water or the cost of equipment degradation. This is because, according to previous literature, these costs would be much lower than those considered and, therefore, negligible. Some strengths should also be mentioned, as our study is the first to present results on the budgetary implications of increasing the use of PD at a national level. In addition, its main scenario is based on the most objective target population to be treated with PD, which is the population likely to receive scheduled HD.

Conclusions

This study demonstrates that the increased use of PD in Spain improves the system's efficiency, generating significant savings in the treatment of ESRD patients from the NHS and societal perspectives. These findings provide valuable evidence to support decision-making and resource allocation strategies in the management of dialysis care.

Abbreviations

APD	Automated Peritoneal Dialysis
CAPD	Continuous Ambulatory Peritoneal Dialysis
CHDC	Contracted Out-Patient Hemodialysis Centre
CHEERS	Consolidated Standards for Health Economic Assessment Reporting
CKD	Chronic Kidney Disease
ESRD	End-Stage Renal Disease
HD	Hemodialysis
HDF	Online Hemodiafiltration
KRT	Kidney Replacement Treatment
KT	Kidney Transplantation
NHS	National Health System
PD	Peritoneal Dialysis
QALY	Quality-Adjusted Life Years

Author contributions

GB, CG, AA, NVV and CA contributed to conception and design, acquisition of data, data analysis and interpretation and validated the results. All authors have made substantial contributions to the development of the manuscript and have approved the final version submitted.

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Data availability

The datasets supporting the findings of this manuscript are publicly available from the following sources: Population data for Spain: Obtained from the National Institute of Statistics (INE), population projections 2022-2072. Available at: https://www.ine.es/jaxiT3/Datos.htm? t=36680Incidence and prevalence of patients with ESRD in Spain: Obtained from the ERA Registry Annual Report 2021. Available at: https://www.era-online.org/wp-content/uploads/2023/12/ERA-Registry-Annual-Report-2021_231206.pdf Costs were obtained from the following Spanish databases: eSalud: Base de datos de costes sanitarios y ratios coste-efectividad españoles. Available at: http://www.oblikue.com/bddcostes/.Bot Plus Web: Consejo General de Colegios Oficiales de Farmacéuticos. Available at: https://botplusweb.portalfarma.com/All assumptions and model parameters used in the analysis were validated by a nephrologist. Additional data generated or analyzed during the study are available from the corresponding author upon request.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

This analysis was sponsored by Baxter S.L. (Spain). Asís Ariznavarreta, Carla Garí and Neus Vidal-Vilar are employees of Outcomes' 10 (a ProductLife Group Company), who received an honorarium from Baxter S.L. in connection with the development of this manuscript. Gemma Barbado and Carlos Alvarez are employees of Baxter S.L.

All authors of the manuscript (GB, CG, AA, NVV, CA) have contributed to the conception and design of the project and to the interpretation of the data; they have participated in the critical review of the intellectual content of the manuscript and have approved the final version presented.

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