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Do we practice what we preach? Dialysis modality choice among healthcare workers in the United Kingdom

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Abstract

Background: In the United Kingdom, over 80% of end-stage kidney disease patients receive in-center hemodialysis. We conducted a survey of UK renal healthcare workers on their preferred dialysis modality if they needed dialysis themselves.

Methods: An anonymized online survey was disseminated to all renal healthcare workers in the United Kingdom. We asked “Assume you are an otherwise well 40-year-old (and, separately, 75-year-old) person approaching end stage kidney disease, you have no living kidney donor options at present. There are no contraindications to any dialysis options. Which dialysis therapy would you choose?” We also asked about factors influencing their choice.

Results: 858 individuals with a median age of 44.3 years responded. 70.2% were female, 37.4% doctors, and 31.1% were senior nurses. There was a preference for peritoneal dialysis over in-center hemodialysis (50.47% v. 6.18%; $p < 0.001$ for 40-year-old and 49.18% v. 17.83%; $p < 0.001$ for 75-year-old assumption) and home hemodialysis (50.47% v. 39.28%; $p < 0.001$ for 40-year-old and 49.18% v. 18.41% for 75-year-old assumption). There was a preference for home hemodialysis over in-center hemodialysis for 40-year-old (39.28% v. 6.18%; $p < 0.001$) but not for 75-year-old. On logistic regression, senior doctors were more likely to opt for PD when compared to nurses. Nurses, allied healthcare professionals, and those of Asian/British Asian ethnicity were more likely to choose in-center hemodialysis.

Conclusions: Most healthcare workers in renal medicine would choose home-based treatment for themselves although the majority of end-stage kidney disease patients receive in-center hemodialysis in the United Kingdom; the reasons for the discrepancy need to be explored.

1 | INTRODUCTION

People with end-stage kidney disease (ESKD) who require chronic dialysis, broadly speaking, have two options: hemodialysis or

peritoneal dialysis. Despite lack of strong evidence to suggest better patient survival or superiority of one dialysis modality over the other,¹ the proportion of patients receiving hemodialysis far outweighs peritoneal dialysis worldwide.²

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In a publicly funded healthcare system of National Health Service in the United Kingdom, the average wait for a kidney transplant for patients with ESKD is around 3 years. For all such patients and any patients unsuitable for transplantation, the options for renal replacement therapy (RRT) include hemodialysis, peritoneal dialysis and, for some, conservative management (no dialysis).

In the United Kingdom, between 2014 and 2018, there was an average annual growth in the prevalence of patients receiving hemodialysis compared to peritoneal dialysis of 0.9% and -0.5%, respectively.³ Many factors have been shown to be associated with choice of RRT including age, education level, degree of comorbidity, lifestyle, pre-dialysis education, and timing of referral to nephrology.²⁻⁶

People with advanced kidney failure come in contact with a wide range of renal healthcare professionals who are involved in the decision-making process for selection of dialysis modality. There is recognition among these healthcare professionals and in national policy that home-based dialysis therapies should be utilized more often.⁶ However, very little is known about what staff working within the renal setting would choose if they needed dialysis themselves. This is an important question because of the potential of healthcare professionals' preferences influencing patient choice. Most of the literature around pre-dialysis choice is based on patients' preferences and what drives choice from the patients' point of view. Very little literature exists on decisions clinicians would make if faced with the prospect of needing RRT themselves.⁷⁻⁹ A survey was conducted asking a variety of renal health care professionals to put themselves in the patients' shoes and imagine scenarios during which they would have to choose RRT options for themselves.

2 | METHODS

Two scenarios based on common cases seen by the authors in the pre-dialysis setting were created and, based on these; an online survey comprising 11 questions was designed using SurveyMonkey (Data S1). Baseline demographics were collected (age, gender, ethnicity), along with the profession of respondents, duration of experience in and main specialty within renal medicine (which could be more than one). Healthcare professionals' dialysis preference was determined by the following question "Assume you are an otherwise well 40-year-old person approaching advanced kidney disease. You have no living kidney donor options at present. There are no contraindications to any of the following dialysis options. Which RRT would you choose?" The options provided included in-centre/satellite haemodialysis (ICHD), home haemodialysis (HHD), continuous ambulatory peritoneal dialysis (CAPD), automated peritoneal dialysis (APD), and conservative management (no dialysis). Only one answer was permitted.

A follow-up question asked about factors influencing their decision, which included pre-specified answer options and a free text "other" option. If hemodialysis was chosen, a further question was asked about their preference for hemodialysis access. The answer options provided included a tunneled central venous catheter, an arteriovenous fistula and an arteriovenous graft. A separate question

(where the age was changed to 75 years) was asked with the same follow-up questions. Three further questions were asked: whether people are given enough information to help them make decisions about RRT, where the respondents would seek information on this topic, and whom they would consult when deciding on the mode of dialysis.

An email invitation via the UK Renal Association was distributed to all renal units in the United Kingdom, asking them to disseminate the survey link to all clinical staff in their department. The survey was also shared on social media via Twitter and Facebook. Respondents were asked to complete the survey within a period of 30 days. A reminder was sent after 15 days. Formal ethical approval was deemed not to be necessary for this anonymized voluntary online survey for healthcare professionals. Respondents' decision to complete the survey was considered to imply consent to participate.

All data are presented as counts (percentage) unless specified. T-tests compared individual choices of RRT with each other. Multivariate binary logistic regression was performed to assess the association between respondents' demographic and role-based characteristics and their choice of RRT in the two hypothetical scenarios. Age, gender, ethnicity, employment grade, and duration of respondents' experience were entered in the model as the independent categorical variables. Multiple pairwise comparisons were performed, including PD and ICHD; PD and HHD; HHD and ICHD; APD and CAPD. Respondents that did not select one of the two options in the pairwise comparisons were excluded from that model. Respondents who selected either APD or CAPD were combined to form a larger group; peritoneal dialysis. IBM SPSS Statistics for Windows 27 (IBM Corp., Armonk, N.Y., USA) was used to perform the logistic regression.

3 | RESULTS

A total of 858 responses to the survey were received. Responses were received from units across the United Kingdom, the majority being from England (85%). Demographic data are summarized in Data S2. A wide range of health professionals working in or affiliated with renal medicine responded, with senior medical clinicians (28.2%), senior nursing staff (31.1%), and allied healthcare professionals (16.2%) being the most common. Respondents were affiliated with all sub-specialties of renal medicine in relatively equal proportions except hemodialysis, which was chosen by 70.9% of the respondents.

Table 1 compares the choice of RRT selected by the respondents based on the hypothetical scenario of approaching end-stage kidney disease as a 40-year-old and then as a 75-year-old. Home-based RRT was selected by 89.8% of respondents as a 40-year-old and by 67.6% as a 75-year-old. Lifestyle was cited as the single most important factor influencing the respondents' choice of RRT as a 40-year-old, while experience of seeing patients on a particular RRT as a 75-year-old. Arteriovenous fistula was the preferred method of vascular access.

RRT choices were compared against each other to test whether the differences in percentages were statistically significant and are detailed in Table 2. The difference between respondents who chose

PD (automated or continuous ambulatory) and those who chose hemodialysis (in-center or home) was found to be statistically significant for both age-based scenarios ($p < 0.001$). Within peritoneal dialysis, the percentage choosing APD was significantly higher compared to CAPD, consistently across both age-based scenarios ($p < 0.001$). When comparing HHD versus ICHD, a higher proportion chose HHD as a 40-year-old ($p < 0.001$); however, there was no difference when the scenario was changed to a 75-year-old ($p = 0.778$).

TABLE 1 Choice of renal replacement therapy.

	40-year-old	75-year-old
RRT choice		
In-center hemodialysis	53 (6.2)	153 (17.8)
Home hemodialysis	337 (39.3)	158 (18.4)
Continuous ambulatory peritoneal dialysis	134 (15.6)	109 (12.7)
Automated peritoneal dialysis	299 (34.9)	313 (36.5)
Conservative management	13 (1.5)	45 (5.2)
Unsure	22 (2.6)	80 (9.3)
Factors influencing choice		
Information available	89 (10.4)	114 (13.3)
Suits lifestyle	548 (63.9)	323 (37.7)
Observed experience	168 (19.6)	359 (41.8)
Other	53 (6.2)	62 (7.2)
Vascular access for hemodialysis		
Tunneled central venous catheter	55 (6.5)	92 (11.0)
Arteriovenous fistula	769 (90.6)	722 (86.0)
Arteriovenous graft	25 (2.9)	26 (3.1)

Note: The cell contents are N(%).

Abbreviation: RRT, renal replacement therapy.

TABLE 2 Comparison of modality choice.

	40-year-old		75-year-old	
	N(%)	Significance	N(%)	Significance
Peritoneal dialysis versus in-center HD				
Peritoneal dialysis	433 (50.5)	$p < 0.001$	422 (49.2)	$p < 0.001$
In-center HD	53 (6.2)		153 (17.8)	
Peritoneal dialysis versus home HD				
Peritoneal dialysis	433 (50.5)	$p < 0.001$	422 (49.2)	$p < 0.001$
Home HD	337 (39.3)		158 (18.4)	
Home HD versus in-center HD				
Home HD	337 (39.3)	$p < 0.001$	158 (18.4)	0.778
In-center HD	53 (6.2)		153 (17.8)	
CAPD versus APD				
APD	299 (34.9)	$p < 0.001$	313 (36.5)	$p < 0.001$
CAPD	134 (15.6)		109 (12.7)	

Abbreviations: APD, ambulatory peritoneal dialysis; CAPD, continuous ambulatory peritoneal dialysis; HD, hemodialysis.

Logistic regression was carried out to further explore any factors that may have contributed to the respondents' choice of RRT (Tables 3 and 4). Four pairwise analyses were carried for each of the two clinical scenarios (PD vs. ICHD, PD vs. HHD, HHD vs. ICHD, and CAPD vs. APD). When comparing PD versus ICHD at age 40, senior renal nurses, junior renal nurses, and renal (healthcare assistants) HCA were more likely than consultant-grade professionals to choose ICHD compared with PD in the multivariate model. The same associations were present for the logistic regression at age 75. Asian or Asian British participants as well as those of other ethnicity (composite category including other, mixed, and those who did not wish to disclose) were more likely to choose ICHD compared to PD at age 75 years. Males were more likely to choose HHD compared to PD at 75 years of age. These differences were seen when comparing one sub-group to another but not overall—nurses, for example, chose PD over ICHD but at a lower percentage when compared to consultant-grade professionals.

Senior medical professionals showed a preference for PD compared to HD across both scenarios. Senior nurses, junior nurses, and HCAs were more likely to choose ICHD compared to HHD at 40 years of age. Participants of Asian or Asian British ethnicity were also significantly more likely to choose ICHD compared to HHD. None of the other independent variables in the model showed a significant difference. The multivariate model for 75 years showed only junior nurses and HCAs were significantly more likely to choose ICHD compared to HHD.

4 | DISCUSSION

Our survey demonstrates that most UK renal healthcare professionals would choose home-based dialysis for themselves in contrast to the current practice in the United Kingdom where <20% of dialysis

TABLE 3 Multivariate logistic regression of predictors of dialysis choice by respondents at age 75 years.

	PD versus ICHD at 75 (n = 575)		PD versus HHD at 75 (n = 580)		HHD versus ICHD at 75 (n = 311)		APD versus CAPD at 75 (n = 422)	
	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
Age								
18–30 years		0.196		0.495		0.134		0.553
31–50 years	0.49 (0.22–1.09)	0.082	1.29 (0.52–3.24)	0.580	0.34 (0.12–0.98)	0.046	1.81 (0.62–5.28)	0.277
>50 years	0.58 (0.24–1.39)	0.219	1.63 (0.60–4.41)	0.338	0.34 (0.11–1.07)	0.066	1.76 (0.54–5.69)	0.347
Gender								
Male	1.46 (0.83–2.58)	0.189	2.2 (1.36–3.56)	0.001	0.65 (0.34–1.25)	0.197	0.91 (0.51–1.64)	0.760
Ethnicity								
White	(–)	0.011	(–)	0.437	(–)	0.854	(–)	0.304
Black or Black British	3.01 (0.84–10.84)	0.091	0 (0–0)	0.999	1497705298.96 (0–0)	0.999	0.89 (0.17–4.75)	0.887
Asian or Asian British	2.18 (1.15–4.12)	0.016	1.31 (0.72–2.39)	0.381	1.21 (0.56–2.59)	0.629	0.92 (0.42–2.02)	0.835
Other	2.63 (1.11–6.24)	0.029	1.88 (0.82–4.32)	0.139	1.46 (0.57–3.72)	0.430	2.78 (0.95–8.18)	0.063
Professional grade								
Renal (or surgical) consultant/associate specialist	(–)	<0.001	(–)	0.083	(–)	0.002	(–)	0.683
Renal (or surgical) registrar/staff grade doctor	0.48 (0.15–1.51)	0.211	0.82 (0.37–1.82)	0.628	0.65 (0.19–2.31)	0.510	0.68 (0.26–1.73)	0.416
Senior renal nurse	2.10 (1.09–4.04)	0.027	1.37 (0.78–2.41)	0.268	1.46 (0.67–3.20)	0.340	1.36 (0.72–2.57)	0.341
Junior renal nurse/ nurse associate	8.44 (3.63–19.61)	<0.001	1.01 (0.36–2.84)	0.984	8.69 (2.71–27.88)	<0.001	0.87 (0.29–2.67)	0.812
Renal healthcare assistant	9.33 (3.56–24.44)	<0.001	2.68 (0.96–7.5)	0.061	3.59 (1.20–10.74)	0.022	1.69 (0.45–6.27)	0.436
Renal allied healthcare professional (for example, pharmacist, dietitian, etc.)	4.20 (2.02–8.75)	<0.001	2.09 (1.1–3.97)	0.024	1.93 (0.87–4.29)	0.106	1.22 (0.53–2.77)	0.641
Professional experience								
0–5 years	(–)	0.696	(–)	0.422	(–)	0.422	(–)	0.055
6–10 years	0.74 (0.35–1.56)	0.422	0.87 (0.43–1.75)	0.701	1.03 (0.42–2.51)	0.950	0.67 (0.30–1.52)	0.340
>10 years	0.93 (0.48–1.79)	0.825	0.67 (0.35–1.28)	0.226	1.54 (0.71–3.33)	0.278	0.39 (0.18–0.87)	0.020
Constant	0.23 (–)	0.005	0.20 (–)	0.003	1.19 (–)	0.785	(–)	0.101

patients receive home-based dialysis.⁷ There is no data on the renal workforce in the United Kingdom, and it was therefore not possible to estimate what percentage of the workforce responded nor whether there was proportional representation of the type of professional among the respondents. When compared to doctors, nurses and allied health professionals were more likely to choose ICHD compared to PD, as were those of Asian or British Asian ethnicity compared with their White Caucasian counterparts.

Dialysis decision choices are difficult for most renal patients. Although shared decision-making is practiced in many centers, there are many factors that may influence patient choice. Patients with chronic illnesses value the advice given by clinicians and this may influence their treatment choice.⁵ In this survey, the paradox of more

doctors opting for PD whereas the majority of patients in the United Kingdom choose ICHD as their first dialysis modality could, in part, be explained by the nurses' choice and their role in patient education.

The majority of renal doctors and nurses consider PD as the optimal initial dialysis therapy for a typical patient has been demonstrated in the past.⁷ However, there are no randomized controlled trials comparing the different modalities of dialysis informing the healthcare professionals' choice.¹⁰ The often quoted superior preservation of residual renal function in patients utilizing peritoneal dialysis may be a factor.¹¹ UK Renal Registry data suggests a survival advantage of PD over hemodialysis in the initial 2 years of therapy.¹² This survival advantage extends to patients on PD who switch over to hemodialysis

TABLE 4 Multivariate logistic regression of predictors of dialysis choice by respondents at age 40 years.

	PD versus ICHD at 40 (n = 486)		PD versus HHD at 40 (n = 770)		HHD versus ICHD at 40 (n = 390)		APD versus CAPD at 40 (n = 433)	
	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Age								
18–30 years		0.327		0.937		0.437		0.725
31–50 years	0.52 (0.17–1.61)	0.256	0.98 (0.52–1.84)	0.947	0.78 (0.25–2.40)	0.665	0.74 (0.31–1.78)	0.502
>50 years	0.78 (0.22–2.77)	0.696	1.04 (0.52–2.10)	0.909	1.27 (0.36–4.53)	0.712	0.84 (0.31–2.24)	0.723
Gender								
Male	1.93 (0.8–4.65)	0.144	1.44 (0.98–2.10)	0.061	1.98 (0.79–5.00)	0.146	1.52 (0.87–2.68)	0.144
Ethnicity								
White	(–)	0.001	(–)	0.629	(–)	0.010	(–)	0.432
Black or Black British	5.87 (0.99–34.91)	0.052	0.58 (0.15–2.24)	0.427	3.69 (0.53–25.85)	0.189	1.44 (0.32–6.60)	0.636
Asian or Asian British	4.68 (2.08–10.52)	<0.001	1.03 (0.65–1.63)	0.912	3.87 (1.70–8.81)	0.001	1.67 (0.87–3.21)	0.121
Other	2.96 (0.86–10.21)	0.085	1.43 (0.72–2.83)	0.308	2.05 (0.62–6.81)	0.241	0.83 (0.27–2.54)	0.740
Professional grade								
Renal (or surgical) consultant/associate specialist	(–)	<0.001	(–)	0.032	(–)	0.002	(–)	0.078
Renal (or surgical registrar) staff grade doctor	0.28 (0.03–2.67)	0.269	0.70 (0.38–1.30)	0.262	0.44 (0.05–4.08)	0.472	1.57 (0.66–3.73)	0.302
Senior renal nurse	3.05 (1.07–8.66)	0.036	0.98 (0.64–1.50)	0.918	3.67 (1.22–11.01)	0.020	1.43 (0.75–2.73)	0.281
Junior renal nurse/nurse associate	9.88 (2.72–35.9)	<0.001	1.51 (0.79–2.86)	0.211	6.40 (1.84–22.24)	0.003	2.61 (0.99–6.90)	0.053
Renal healthcare assistant	15.63 (4.03–60.57)	<0.001	1.55 (0.70–3.42)	0.278	10.41 (2.50–43.40)	0.001	5.46 (1.73–17.17)	0.004
Renal allied healthcare professional (for example, pharmacist, dietician, etc.)	1.74 (0.42–7.1)	0.443	1.71 (1.04–2.80)	0.033	1.05 (0.28–4.01)	0.939	1.84 (0.83–4.07)	0.134
Professional experience								
0–5 years	(–)	0.963	(–)	0.910	(–)	0.663	(–)	0.345
6–10 years	0.85 (0.26–2.82)	0.797	1.08 (0.63–1.83)	0.783	0.58 (0.18–1.90)	0.366	0.74 (0.35–1.56)	0.430
>10 years	0.89 (0.32–2.48)	0.820	0.98 (0.6–1.59)	0.923	0.76 (0.28–2.09)	0.597	0.59 (0.29–1.20)	0.145
Constant	0.04 (–)	<0.001	0.62 (–)	0.212	0.05 (–)	<0.001	0.46 (–)	0.164

in a timely manner compared with hemodialysis alone.¹³ However, categorical data from a recent study demonstrated a lower burden of disease and a higher employment rate in PD to HD.¹⁴

Participants who chose PD as their modality of choice preferred APD over CAPD. Many patients choose APD over CAPD for lifestyle benefits, the ability to achieve ultrafiltration and adequacy goals, possible lower incidence of peritonitis and lower intra-abdominal pressures.¹⁵ It is also likely that staff are aware of the benefit of APD over CAPD in fast transporters.

The lack of preference for HHD over ICHD in the older age group is in keeping with real life experience, which shows the mean age of patients on ICHD to be at least 10–20 years older than those on HHD.¹⁶

Nephrologists' opinions on the best modality of RRT for their patients have been previously surveyed.^{7,17–19} In a survey of 324 nephrologists from Europe, Canada, and United States,¹⁷ respondents overwhelmingly supported home dialysis treatments recognizing the better quality of life on PD and HHD than ICHD. In another

survey, 56% of 6595 international renal professionals considered self-care therapy (PD or HD) superior to ICHD in the long-term and 49% considered PD as the best initial dialysis treatment.⁷ On the other hand, a study in the Philippines showed that 10% of the 64 respondents recommended PD as the first-choice treatment considering preservation of residual renal function as one of the most important factor affecting their decision-making.¹⁸ In a more recent survey, roughly equal number of French nephrologists favored PD and HD for their patients, although there was a preference for PD among younger nephrologists.⁸

Interestingly, one study from India that asked patients why they chose their dialysis modality revealed that more than a quarter of the patients surveyed cited supervised care at the hospital as being a factor in choosing hemodialysis.²⁰ The authors postulated a cultural preference for supervised care. This could explain the choices made by Asian and British Asian respondents in our study. The majority of patients in this study reported that their nephrologists' recommendation was the deciding factor in the choice they made. The importance of bias in healthcare worker and the impact this has on patients is discussed by Sabin.¹⁵ Although an in-depth analysis of the impact of healthcare worker bias and modality choice is beyond the scope of this paper, it would be reasonable to recommend that healthcare worker training in shared decision-making should include strategies to reduce bias and how to avoid unconscious and implicit bias when consulting with patients.

The results of these surveys clearly establish that home-based or self-care therapies are perceived by professionals to be the best dialysis modalities for their patients. Our survey is the first to explore dialysis preference of renal healthcare professionals for themselves in different age-based scenarios. One previous survey had asked a single question as part of a larger survey of nephrologists examining their self-assessment of preparedness for providing care to dialysis patients—an overwhelming 97% of the nephrologists opted for home-based dialysis therapies for themselves. In our survey, the percentage of the nephrology community choosing home-based therapies for themselves approached 90%.

Our study explored possible reasons for the treatment choices made by the respondents and interestingly the most important influencing factor switched from suitability with lifestyle for a 40-year-old to observed experience when choosing treatment for their older selves. A previous study also showed that lifestyle was an important factor in a survey of patients making decisions on modality of RRT.⁵ It is possible that for the 75-year-old, who are likely to be retired, lifestyle has less of an impact and experience plays a bigger role in modality choice.

Preparation for dialysis is carried out by a large team of healthcare professionals all of whom play an important role in educating patients about kidney disease and its management. A major strength of our survey is that the study included renal trainees, nurses, and other allied health professionals. Nurses and allied health professionals were more likely to choose ICHD. Possible reasons for this may include selection bias due to the nurses' profession (more HD

nurses compared to PD) and a lack of knowledge about home-based therapies.

This is the first national study using real life scenarios to explore modality preference among the whole spectrum of renal healthcare workers. Using social media allowed access to a broad reach of individuals. Our study lacks qualitative data on focus groups, and we are unable to comment on how proportionally representative the responses were.

We did not explore the discordance between the survey results of what doctors believe is the best form of dialysis for their patients and themselves compared to observed prevalence of different modalities of dialysis in the United Kingdom. The discrepancy raises an important ethical dilemma: If the clinicians feel a therapy is best for their patient, should they revert to a “doctor knows best” approach compared to a shared decision-making or complete patient autonomy?²⁰

In conclusion, in this survey, the UK renal healthcare professionals overwhelmingly chose home-based dialysis therapies when presented with hypothetical scenarios to choose a dialysis modality for themselves. The reasons for the difference in survey findings and observed practice needs further research.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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