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PATIENT PERSPECTIVES ON RENAL REPLACEMENT THERAPY MODALITY CHOICE: A MULTICENTER QUESTIONNAIRE STUDY ON BIOETHICAL DIMENSIONS

Michael S. Balzer,[1] Christian Clajus,[2] Gabriele Eden,[3] Frank Euteneuer,[4,5] Hermann G. Haller,[1] Heike Martin,[6] Margret Patecki,[1,7] Roland Schmitt,[1,8] Marcus Hiss,[1,8] and Katharina Fuerholzer[9]

Department of Nephrology and Hypertension,[1] Hannover Medical School, Hannover, Germany; Dialysis Clinic Hameln,[2] Hameln, Germany; Department of Nephrology and Hypertension,[3] Staedtisches Klinikum Braunschweig, Braunschweig, Germany; Clinical Psychology and Psychotherapy,[4] Medical School Berlin, Berlin, Germany; Clinical Psychology and Psychotherapy,[5] Philipps University Marburg, Marburg, Germany; Center for Nephrology Zwickau,[6] Zwickau, Germany; Center for Renal, Hypertensive and Metabolic Disorders,[7] Hannover, Germany; Kuratorium fuer Dialyse und Nierentransplantation e.V.,[8] Hannover, Germany; and Language and Ethics Task Force,[9] German Academy for Ethics in Medicine, Goettingen, Germany

♦ ***Background:*** **Peritoneal dialysis (PD) incidence and prevalence in Germany are low compared with hemodialysis (HD), an underachievement with multifactorial causes. Patient perspectives on renal replacement therapy (RRT) choice play a growing role in research. To date, and to the best of our knowledge, the importance of bioethical dimensions in the context of RRT choice has not been analyzed. The aim of this multicenter questionnaire study was to delineate differences in patient perspectives of PD vs HD in terms of bioethical dimensions, thus helping nephrologists target potential PD candidates more efficiently.**

♦ ***Methods:*** **A total of 121 stable outpatients from 2 tertiary care hospitals and 4 dialysis clinics were surveyed for bioethical dimensions ("autonomy," "beneficence," "non-maleficence," "justice," and "trust") with ranking and Likert scale items. Inclusion criteria were RRT > 3 months, age ≥ 18 years, and sufficient cognitive and language skills.**

♦ ***Results:*** **A surprisingly high percentage of patients felt excluded from the RRT choice process. Peritoneal dialysis patients were more critical of RRT. They used more versatile information sources on RRT, whereas HD patients were mainly informed by their nephrologist. Peritoneal dialysis patients felt more often dissatisfied with RRT than HD patients and had less trust in their co-patients. However, PD patients felt less autonomy impairment regarding body integrity, fluid balance, and dialysis in general.**

♦ ***Conclusions:*** **Our study demonstrates that PD patients showed more scrutiny of their situation as patients, especially their co-patients. Their treatment empowered them toward feeling more autonomous than HD patients. These new insights into patient perspectives on RRT choice might facilitate modality choice for nephrologists.**

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KEY WORDS: Autonomy; dialysis choice; justice; trust.

Peritoneal dialysis (PD) is an important treatment for patients with end-stage renal disease (ESRD) requiring renal replacement therapy (RRT). Compared with in-center hemodialysis (HD), overall survival on PD is similar (1,2), yet PD provides superior quality-of-life measures (3,4) and cost savings (5) despite the impact complications such as peritonitis might have on patients (6). The percentage of ESRD patients treated with PD varies markedly between and within countries, and non-medical issues contribute significantly to this variation (7,8). Despite initiatives to stimulate PD practice in regions with low prevalence (9–11), usage remains low (12,13), which is inconsistent with choices that would be made with an optimized patient-centered approach to decision-making and care (14). With regard to variability in practice patterns, it seems worthwhile to note that similarly to other "Western" countries with fairly equal dialysis reimbursement for both HD and PD, in Germany PD is generally chosen by patients who are younger, fitter, and who more often participate actively in professional life, whereas this may be the other way around in other parts of the world, where PD might be the first choice for immobile and infirm patients.

To improve outcomes of patients on RRT, understanding patients' needs and perspectives and incorporating them into medical care—and especially in RRT choice—is critical (14). Against the backdrop of an unchanged low PD prevalence in Germany of only 7% (15), the Choice of Renal Replacement Therapy (CORETH) study recently showed that psychosocial characteristics are much more important than physical or environment-related factors (16). In this study, patient psychological typology encompassed depression, psychosocial well-being, and autonomy preference. Patient preferences for bioethical dimensions other than autonomy, however, were not analyzed.

Since the early days of RRT delivery, the 4 bioethical principles of "autonomy," "beneficence," "non-maleficence," and "justice" described by Beauchamp and Childress (17) have been

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Correspondence to: Michael S. Balzer, Department of Nephrology and Hypertension, Hannover Medical School, Carl-Neuberg-Str. 1, 30625 Hannover, Germany

balzer.michael@mh-hannover.de

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intertwined closely with medical decision-making. Especially within the context of the physician-patient relationship, these bioethical principles are still highly relevant for day-to-day practice (18). Before the turn of the millennium, patient-oriented research focused mainly on patient autonomy, whereas recently, financial constraints of healthcare systems and the mismatch of supply and demand regarding donor organs put forward issues of allocation, justice, and trust (18). Moreover, ESRD patients regard issues of independence, quality and quantity of life, and flexibility in daily schedule as important (19).

It is therefore obvious that in addition to justice and allocation, issues of autonomy are still of prime importance to ESRD patients. To the best of our knowledge, there are no analyses on the impetus of bioethical factors other than autonomy on patients' beliefs and needs in the context of their everyday life on RRT. We hypothesized that using surrogate markers derived from the bioethical approach of Beauchamp and Childress would yield novel insights into perceptions of patients on dialysis.

METHODS

STUDY DESIGN AND PATIENT POPULATION

After local ethics board approval (MHH#3508-2017), the study was carried out as a cross-sectional multicenter questionnaire study. The study protocol was published previously (20). In short, within a time frame of 9 months (August 2017 – May 2018), stable chronic dialysis patients on either HD or PD were surveyed in 2 tertiary-care hospitals, 2 not-for-profit, and 2 for-profit dialysis clinics. Local nephrologists screened PD patients in respective outpatient clinics and an equal number of HD patients from randomly selected in-center HD daytime shifts. Inclusion criteria were ESRD due to any cause, time on RRT > 3 months, age ≥ 18 years, and sufficient language skills. Exclusion criteria were status post-kidney transplantation, prior dialysis modality switch resulting in treatment with the respective other RRT modality > 3 months, inability to give consent, insufficient cognitive and language skills, and refusal to participate. After obtaining written informed consent, patients were asked to fill out questionnaire items by themselves. The questionnaire was jointly developed by a nephrologist (MSB), a medical ethicist (KF) and a clinical psychologist experienced in questionnaire design (FE) and is provided as a Supplementary File. The questionnaire was pre-tested in $n = 10$ HD vs $n = 8$ PD patients. Response completeness and internal validity were tested and found to be satisfactory. It was decided to include all pre-tested patients into the overall study population. Completed questionnaires were returned by mail in closed envelopes preventing access of local medical care providers to patients' answers.

DEMOGRAPHIC, CLINICAL, AND SOCIOECONOMIC DATA

Demographics included gender and age. Clinical characteristics encompassed body height, body weight, body mass index, dialysis modality, dialysis access form, dialysis vintage, residual urine output, primary kidney disease, and comorbidities as per Davies comorbidity score (21). Socioeconomic characteristics included marital status, number of children, number of children < 18 years of age, current professional status, profession, and highest educational level.

QUESTIONNAIRE DATA

The questionnaire consisted of 3 parts: In part 1, we evaluated the acuity of need for RRT and patients' information on and involvement in RRT modality choice.

In part 2, patients were asked to rank 4 bioethical dimensions by importance. Bioethical dimensions were explained to patients as follows: Autonomy: "I—as a dialysis patient—stay as independent as possible (with regard to medical decision-making, daily activities, independence from others)"; beneficence: "dialysis is for the best of my well-being"; non-maleficence: "dialysis is doing as little harm to me as possible"; justice: "I—as a dialysis patient—have the easiest possible access to medical care". Furthermore, we evaluated treatment satisfaction and asked which RRT patients would prefer in retrospect.

In part 3, patients were surveyed using 6-point Likert scale items ("none," "very little," "little," "neutral," "much," and "very much"). Questionnaire items were structured in a 2-layered fashion with 3 main categories ("autonomy impairment," "justice," and "trust") and several respective subcategories: Within the category "autonomy impairment," patients were asked how much they felt that their autonomy was impaired by dialysis with regard to: 1) overall situation; 2) reduced physical capacity; 3) body integrity; 4) presence of a PD catheter, HD catheter or arteriovenous (AV) fistula; 5) pain; 6) medications; 7) need for hospital admission; 8) nutrition; 9) fluid intake; 10) reduced urine output; 11) body weight; 12) time consumption on dialysis; 13) activities of daily living; 14) recreational activities; and 15) professional life. Within the category "justice," patients were asked how strongly they felt that justice was preserved with regard to the 15 items described above. Within the category "trust," patients were asked how much they thought that aspects of either autonomy, beneficence, non-maleficence, or justice are impacted by their: 1) RRT in general; 2) nephrologist; 3) dialysis nurse; 4) social network; 5) themselves as a renal patient; and 6) their co-patients.

STATISTICAL ANALYSIS

Data for categorical variables are presented as percentages and for continuous variables as mean ± standard deviation. Normality was tested according to D'Agostino & Pearson. Continuous variables were analyzed using unpaired *t*-test or Mann-Whitney test. Categorical variables were analyzed using Pearson chi-squared test and dichotomous variables by Fisher's exact test. Analysis of ranking and Likert scale questionnaire items from parts 2 and 3 included both single-item analysis using median test, and analysis of sum scales using the (non-)parametric tests mentioned above. Additionally, sum scales were analyzed using linear regression after adjustment for baseline covariates. Sum scales for categories "autonomy impairment," "justice," and "trust" were constructed after removal of content-invalid items and estimation of missing answers using an expectation-maximization algorithm strategy and demonstrated excellent internal consistency with Cronbach's alpha of 0.882, 0.889, and 0.951, respectively. Sum scales were normalized to allow a score range from 0 to 100 points for each category. All tests were 2-tailed. A $p < 0.05$ was considered statistically significant. SPSS Statistics v 22.0 (SPSS Inc., Chicago, IL, USA) was used for analysis.

RESULTS

DEMOGRAPHIC, CLINICAL, AND SOCIOECONOMIC DATA

In total, 311 patients were evaluated for inclusion and exclusion criteria. Out of 150 patients meeting inclusion criteria, 22 declined to participate and 7 presented incomplete data sets. The remaining 121 patients (63 HD, 58 PD) were included in the analysis (Figure 1). All patients were of European descent and demographic and clinical patient characteristics were fairly similar between both patient groups (Table 1). However, dialysis vintage was lower and residual urine output was higher in PD patients. Socioeconomic characteristics are shown in Table 2. Peritoneal dialysis patients were more often full-time and part-time workers. This possibly reflects a higher level of professional rehabilitation and functioning in PD patients, given the similar distribution of gender, age, primary kidney disease, and comorbidities between patient groups.

QUESTIONNAIRE – PART 1: RRT ACUITY, PATIENT INFORMATION, AND MODALITY CHOICE

In most HD patients, the need for RRT developed over several years (60%) or months (11%), whereas less than one-third required RRT start within weeks (10%) or days (19%). This did not differ significantly from PD patients (54%, 16%, 16%, 14%, respectively, $p = 0.689$). Compared with HD patients, there was a trend that more PD patients felt informed about the different RRT modalities prior to dialysis start (73% HD vs 86% PD, $p = 0.090$). Similarly, a higher percentage of HD patients felt excluded from the RRT modality choice, narrowly missing statistical significance (30% HD, 16% PD, $p = 0.071$). Hemodialysis patients who felt included in modality choice stated mainly that their nephrologist had an impact on their decision, whereas PD patients used a significantly larger network of people comprising family members, dialysis nurses, and other patients ($p = 0.003$; Figure 2a). Additionally, while HD patients mostly relied on information by their physician and/or dialysis unit, PD patients informed themselves more diversely using additional brochures, the Internet, or other sources of information ($p < 0.001$; Figure 2b).

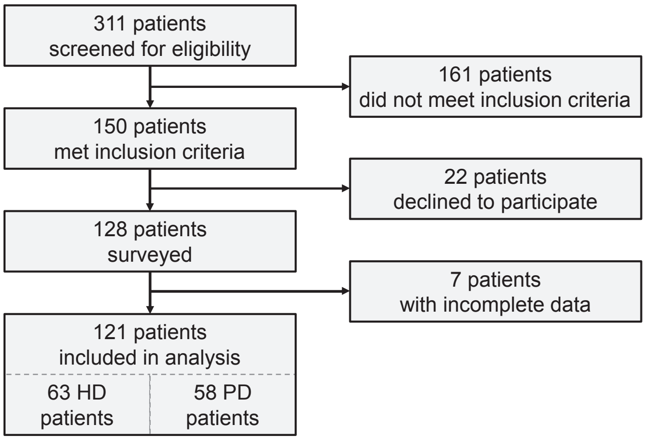

Figure 1 — Flow chart of study population. HD = hemodialysis; PD = peritoneal dialysis.

QUESTIONNAIRE – PART 2: TREATMENT SATISFACTION, RANKING OF BIOETHICAL DIMENSIONS

Surprisingly, overall, patient satisfaction was significantly higher among HD patients ($p = 0.008$) with more HD than PD patients being very satisfied (52% HD, 33% PD) or rather satisfied (29% HD, 31% PD) and fewer being dissatisfied (5% HD, 6% PD) or very dissatisfied (6% HD, 26% PD). At the same time, not a single PD patient (0.0%) would have in retrospect preferred HD over PD, while 11% of HD patients were undecided and 5% were sure that they would choose differently ($p < 0.001$).

When asked to rank the 4 dimensions "autonomy," "beneficence, "non-maleficence," and "justice" by importance, there were only trend differences between patient groups (Supplementary Figure 1). As most important dimension, patients ranked autonomy (50% HD, 62% PD, $p = 0.166$), beneficence (34% HD, 36% PD, $p = 0.380$), non-maleficence (3% HD, 3% PD, $p = 0.251$), and justice (13% HD, 0.0% PD, $p = 0.055$), respectively.

QUESTIONNAIRE – PART 3: "AUTONOMY IMPAIRMENT," "JUSTICE," AND "TRUST"

Results of normalized sum scores of the categories "autonomy impairment," "justice," and "trust" ranging from 0 to 100 points are depicted in Figure 3. Single items of questionnaire part 3 are shown in Supplementary Figure 2. Within the category "autonomy impairment," sum scale analysis showed that HD patients felt significantly more impaired in their autonomy than PD patients (51.7 HD, 44.1 PD, $p = 0.021$). Additionally, single-item analysis demonstrated that PD patients felt significantly less autonomy impairment regarding their situation as dialysis patient in general ($p = 0.029$), their body integrity ($p = 0.023$), and their fluid balance ($p = 0.042$).

Sum scale analysis of the category "justice" failed to demonstrate significant between-group differences (51.4 HD, 52.3 PD, $p = 0.539$). However, single-item analysis revealed

TABLE 1
Demographic and Clinical Characteristics of Patients

	HD patients (*n*=63)	PD patients (*n*=58)	*P* value
Gender, M/F	37/26	33/25	0.856
Age, mean±SD, years (range)	64.5±15.7 (22.9–90.7)	60.1±16.4 (23.8–87.0)	0.125
Body height, mean±SD, cm (range)	170.8±8.2 (157.0–190.0)	172.3±10.5 (144.0–196.0)	0.359
Body weight, mean±SD, kg (range)	80.6±22.1 (40.6–146.0)	77.0±17.8 (50.0–135.0)	0.388
BMI, mean±SD, kg/m^2 (range)	27.5±6.7 (14.6–50.5)	25.9±5.1 (17.7–39.0)	0.231
Dialysis modality			
In-center HD day/in-center HD night/home HD	55/6/2		
In-center APD/home APD/home CAPD		8/22/28	
HD access			
AV fistula or graft/HD catheter	56/7		
Dialysis vintage, mean±SD, years (range)	5.2±4.3 (0.4–20.0)	2.9±2.9 (0.3–12.9)	0.001
Residual urine output, mean±SD, mL (range)	783±829 (0–3,200)	1,203±810 (0–3,250)	0.004
Primary kidney disease			0.466
Diabetic nephropathy (%)	11 (17.5)	8 (13.8)	
Hypertension (%)	7 (11.1)	11 (19.0)	
Glomerulonephritis (%)	14 (22.2)	17 (29.3)	
ADPKD (%)	9 (14.3)	5 (8.6)	
Pyelonephritis (%)	2 (3.2)	0 (0.0)	
Vascular/renal artery stenosis (%)	6 (9.5)	2 (3.4)	
Other (%)	10 (15.9)	11 (19.0)	
Unknown (%)	4 (6.3)	4 (6.9)	
Davies comorbidity score, mean±SD (range)	1.59±1.14 (0–4)	1.43±1.26 (0–4)	0.323
Ischemic heart disease (%)	24 (38.1)	15 (26.3)	0.179
LV dysfunction (%)	8 (12.7)	15 (26.3)	0.067
Peripheral vascular disease (%)	7 (11.1)	5 (8.8)	0.766
Diabetes mellitus (%)	17 (27.0)	13 (22.8)	0.675
Malignancy (%)	11 (17.5)	12 (21.1)	0.649
Systemic collagen vascular disease (%)	6 (9.5)	1 (1.8)	0.117
Significant other (%)	23 (36.5)	19 (33.4)	0.927

HD = hemodialysis; PD = peritoneal dialysis; SD = standard deviation; BMI = body mass index; APD = automated PD; CAPD = continuous ambulatory PD; AV = arteriovenous; ADPKD = autosomal dominant polycystic kidney disease; LV = left ventricular.

that PD patients tended to feel stronger unfairness in the fact that dialysis has an impact on their professional life (p = 0.094), which ties in with the significantly higher proportion of full-time and part-time workers among PD patients (Table 2).

Sum scale analysis of the category “trust” showed that PD patients generally had significantly more trust than HD patients (84.0 HD, 88.9 PD, p = 0.018). Peritoneal dialysis patients tended to have more trust in their nephrologist (p = 0.059) and significantly more trust in their dialysis nurses (p = 0.025); interestingly, they had significantly less trust in their co-patients (p = 0.012). When analyzing patients’ trust, we noted that PD patients in general had more trust that their care providers’ beliefs and actions are in keeping with the 4 bioethical principles. Regarding autonomy, PD patients had significantly more trust that their dialysis treatment does not impair their independence (p = 0.004), and that their dialysis nurses’ beliefs are in keeping with respect for patient autonomy (p = 0.040). Regarding beneficence, PD patients were significantly more convinced that their dialysis nurses’ beliefs are to the best of patients’ well-being (p = 0.001). Regarding non-maleficence, PD patients had significantly more trust that their dialysis treatment does not harm them (p = 0.021), and that their nephrologist’s as well as their dialysis nurses’ beliefs are in keeping with not doing harm to patients (p = 0.001, p = 0.011, respectively). Also, PD patients were significantly more convinced that their nephrologist’s and dialysis nurses’ beliefs are in keeping with justice towards patients (p = 0.033, p = 0.001, respectively).

As baseline characteristics between HD and PD patients were significantly different with respect to dialysis vintage and current professional status, we performed additional linear regression for all 3 sum scales after adjustment for these 2 covariates. The RRT type predicted scores on sum scale “trust” both when entered alone (B = 9.2, $p < 0.0001$) and after adjustment (B = 8.9, p = 0.008), while covariates did not. Also, RRT type predicted scores on sum scale “autonomy impairment” both when entered alone (B = 13.1, p = 0.019) and after adjustment (B = 5.9, p = 0.041). In addition, current professional status (B = 4.3, p = 0.032), but not dialysis vintage (B = 0.1, p = 0.673) was a statistically significant important covariate explaining at least part of the significant differences between HD and PD patients regarding autonomy impairment.

TABLE 2
Socioeconomic Characteristics of Patients

	HD patients (*n*=63)	PD patients (*n*=58)	*P* value
Marital status			0.213
Single (%)	8 (12.9)	7 (12.3)	
Partnership (%)	1 (1.6)	7 (12.3)	
Married (%)	34 (54.8)	29 (50.9)	
Divorced (%)	10 (16.1)	6 (10.5)	
Widowed (%)	9 (14.5)	8 (14.0)	
No. of children, mean±SD (range)	1.1±1.2 (0–5)	0.9±1.2 (0–4)	0.253
No. of children <18 y of age, mean±SD (range)	0.1±0.3 (0–2)	0.2±0.6 (0–4)	0.416
Current professional status			0.008
Full-time work (%)	3 (4.9)	15 (26.8)	
Part-time work (%)	2 (3.3)	4 (7.1)	
Sporadic employment (%)	1 (1.6)	3 (5.4)	
Unemployed (%)	2 (3.3)	0 (0.0)	
Old-age pension (%)	34 (55.7)	22 (39.3)	
Invalidity pension (%)	19 (31.1)	12 (21.4)	
Profession			0.124
Blue-collar worker (%)	6 (16.7)	2 (4.5)	
Employee (%)	23 (63.9)	26 (59.1)	
Civil servant (%)	1 (2.8)	8 (18.2)	
Self-employed (%)	5 (13.9)	7 (15.9)	
Helping family member (%)	1 (2.8)	1 (2.3)	
Highest educational level			0.414
Certificate of secondary education (%)	22 (36.1)	17 (30.9)	
Secondary school level I certificate (%)	23 (37.7)	17 (30.9)	
Advanced technical college entrance qualification (%)	6 (9.8)	4 (7.3)	
A levels (%)	4 (6.6)	4 (7.3)	
University degree (%)	3 (4.9)	10 (18.2)	
No school degree (%)	2 (3.3)	1 (1.8)	
Other (e.g. foreign degree) (%)	1 (1.6)	2 (3.6)	

HD = hemodialysis; PD = peritoneal dialysis; A levels = advanced levels.

Thirdly, RRT type did not predict scores on sum scale "justice," which is in accordance with the results from Figure 3.

DISCUSSION

The International Society of Nephrology Ethical Dialysis Task Force recently stated that core ethical values and principles of healthcare provision include, among other things, engagement of patients and their families when making decisions about their own care (22). Patient-oriented research represents a much-needed shift in focus and is increasingly being recognized as necessary to successfully address the needs of patients and improve health outcomes (14). In this context, recent evidence highlighted the importance of informing ESRD patients and their relatives about dialysis modalities in order to boost patient empowerment and increase home dialysis (23).

Along those lines, when analyzing patients' perceptions of information about and involvement in RRT choice, we found that, compared with HD patients (73%), a higher percentage of PD patients (86%) felt informed about the different modalities prior to dialysis start, and that a higher percentage of HD patients (30%) compared with PD patients (16%) felt excluded. This is in line with the EPOCH-RRT study demonstrating that 47% of HD patients thought that the decision for RRT modality had largely not been their choice (19), while PD participants more frequently reported that they were provided enough information and were engaged in the decision-making process (24). Similarly, the CORETH study showed that up to one-third of ESRD patients felt insufficiently involved (25). We also found that for their modality, decision-making PD patients used a significantly larger network of people, comprising family members, dialysis nurses, and other patients, which again is in line with other data (19). Likewise, in our study, a substantial proportion of HD patients would in retrospect have chosen PD over HD, whereas not a single PD patient would have chosen HD. This is supported by empirical evidence that up to 20% of HD patients would have chosen PD if provided comprehensive consultation (25).

In order to improve a patient's treatment choice, responsible clinical decision-making needs a fuller appreciation of how patients' outcome preferences, illness and treatment beliefs, and quality of life interact (26). Recently, a publication on patients' viewpoint on decision-making with respect to dialysis has attracted attention (27). In the context of ESRD patients'

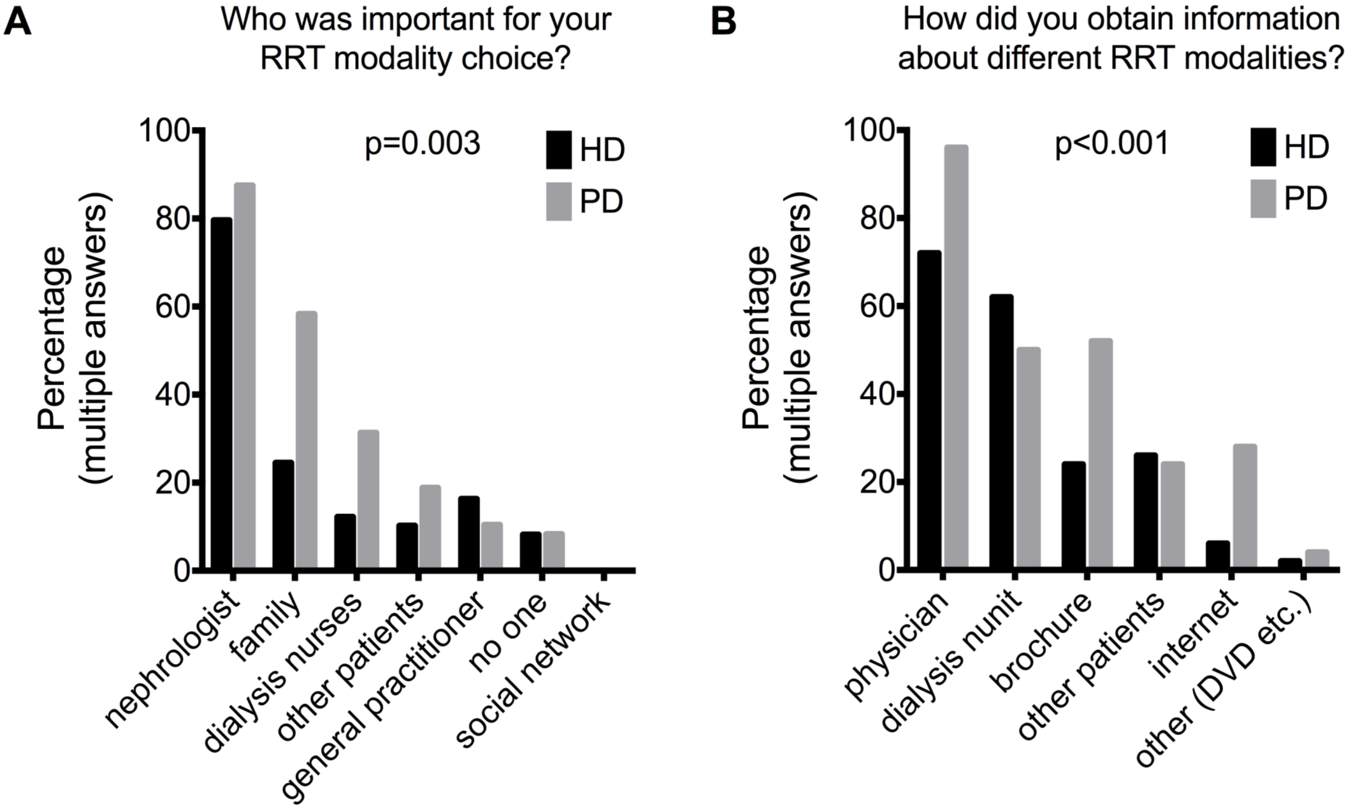

Figure 2 — Influencers of modality choice; information sources on modality types. RRT = renal replacement therapy; HD = hemodialysis; PD = peritoneal dialysis.

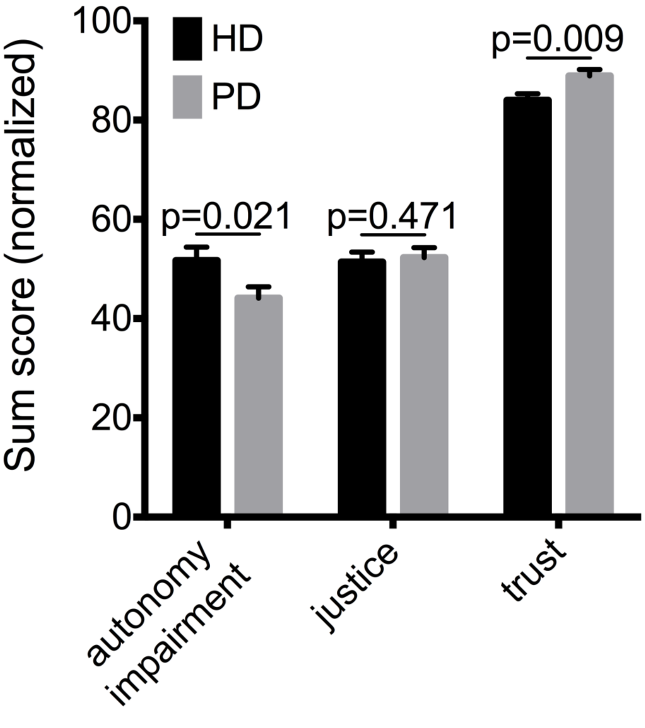

Figure 3 — Sum scores of questionnaire categories. HD = hemodialysis; PD = peritoneal dialysis. Bars depict expectation-maximization (EM)-estimated responses of all 121 patients and were normalized to range from 0 to 100 points±standard error of the mean (SEM).

RRT choice, there is ample research available on "autonomy" (16,19,28–32). However, other bioethical dimensions have not been systematically analyzed in this context. The bioethical concept of autonomy is strongly influenced by coherentism, an approach defined by Beauchamp and Childress (17), taking into account also "beneficence," "non-maleficence," and "justice." This model has proven very useful in issues of decision-making regarding dialysis vs conservative care for frail or older patients (32,33). Although autonomy frequently dominates among those categories, all 4 can be regarded as equivalently important: "Autonomy" manifests itself in patients' rights to make decisions based on their own values, aims, and beliefs. "Beneficence" traces back to the principle of fiduciary duties, meaning physicians are supposed to care for the prevention and therapy of diseases, reduce pain, and further patients' well-being. "Non-maleficence" requires physicians to avert harm and unnecessary risks from patients. Finally, "justice" allows for medical benefits to be allocated in an equal and fair manner. These principles are paramount for the physician-patient relationship. Patients, however, need to trust and rely on the fact that their medical care providers respect these principles. In contrast to these 4 dimensions, the issue of "trust" is oftentimes neglected, although, once broken, its putatively detrimental impact on the physician-patient relationship cannot be dismissed.

We analyzed the bioethical principles "autonomy," "beneficence," "non-maleficence," "justice," and "trust" in the context of RRT choice. We herein report for the first time differences in patients' perceptions concerning a comprehensive list of bioethical principles. In accordance with the literature, both patient groups ranked autonomy most important, whereas HD patients experienced more autonomy impairment both in general and with regard to specific issues such as body integrity or fluid balance. As PD patients had a higher professional performance, it was not surprising that in contrast to HD patients, they regarded professional constraints due to dialysis treatment as unjust. Because we did not evaluate frailty in our patients, it is valid to speculate that patients with a higher comorbidity index had higher scores on the autonomy impairment sum scale. Indeed, comorbidity score was positively correlated, albeit weakly, with autonomy impairment in our patient cohort (Pearson's rho = 0.183, $p = 0.044$). However, it is necessary to note that there were no significant differences between our HD and PD patient cohorts with respect to comorbidity scores (Table 1). Most interestingly, PD patients generally had significantly more trust towards their medical care providers both in general and with regard to the 4 bioethical dimensions. They believed more often than HD patients that their medical care providers respected their autonomy, cared for their well-being, averted damage, and acted justly towards patients. To the best of our knowledge, there is only 1 study partially analyzing patient trust; the authors used a semi-structured interview approach in chronic kidney disease patients, which identified developing and sustaining trusting relationships among clinicians, family, and the community as central to improving health gains for indigenous groups in New Zealand (34). To our surprise, while co-patients in our study played an equally important role in obtaining information on RRT modalities prior to dialysis initiation (26% HD, 24% PD), in contrast, once on chronic treatment, PD patients demonstrated significantly less trust in their co-patients than HD patients. This requires careful interpretation, though. One could speculate that declining trust in co-patients might be related to the fact that PD patients in comparison with HD patients have naturally reduced co-patient exposure. On the other hand, PD patients demonstrated more trust in their medical care providers, which they also see considerably less often than HD patients. Another explanation could be that PD patients demonstrate a more critical character and are warier of their therapy as they may have learned to successfully self-manage their therapy. In the course of PD treatment, patients may have become authorities and thus feel closer to their medical care providers instead of relying on their co-patients. Therefore, we hypothesize that PD treatment empowers patients to become independent and critical experts on their own disease. This goes parallel with our results that PD patients were generally more often (very) dissatisfied with their treatment than HD patients, which is in contrast to what others have shown (16,35). Also, we cannot exclude that the nature of our questionnaire might have provoked a more critical stance on treatment satisfaction in self-managing PD patients and thus distorted results in favor of HD patient satisfaction. Moreover, significant differences regarding full-time and part-time working status among HD vs PD patients might potentially have influenced responses regarding autonomy, as linear regression has demonstrated. Along those lines, observed differences may also not be a direct consequence of the RRT type HD vs PD itself, but of the different "mind-set" of those individuals who choose those therapies. Although we took great care to pre-test whether participants understood the ethical concepts explained in the questionnaire, we cannot fully exclude the possibility that some patients did not fully understand the whole questionnaire. Lastly, our study is limited by the fact that retrospective questions confer the risk of recall bias. Although linear regression analysis did not demonstrate a statistically significant impact of dialysis vintage on sum scale results, we cannot fully exclude that differing dialysis vintage might have skewed patients' responses, especially in view of data showing that perceptions might change already after a fairly short amount of time (36).

CONCLUSION

Our study reveals that a substantial proportion of patients felt uninformed about and excluded from their RRT choice. Our findings imply that PD patients show more criticism and scrutiny toward their situation as patients, especially toward their co-patients. Their treatment empowers them to feel less impaired in their autonomy than HD patients. Differences between HD and PD patients regarding their perspective toward bioethical dimensions might help nephrologists get a better insight into patient RRT eligibility. Therefore, incorporating a bioethical dimensions assessment in an individual patient might be useful within a participative RRT modality choice process.

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DISCLOSURES

The authors have no financial conflicts of interest to declare.

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