SELF REPORTED END STAGE RENAL DISEASE ADHERENCE QUESTIONNAIRE AND ITS ASSOCIATION WITH POTENTIAL BIOMARKERS OF NON ADHERENCE

Verónica Poveda[1,2,3], Leonilde Amado[4], Madalena Filgueiras[5], Laetitia Teixeira[1,3], Vasco Miranda[4,5,6], Alice Santos-Silva[7,8], Constança Paúl[13], Elísio Costa[7,8]

1-Abel Salazar Biomedical Sciences Institute, University of Porto, Porto, Portugal; 2- University of Santa Elena, La Libertad, Ecuador; 3- CINTESIS - Center for Health Technology and Services Research (CINTESIS), University of Porto, Porto, Portugal; 4- Nephrocare Portugal, SA - Nephrocare Maia, Maia, Portugal; 5- Clínica de Hemodiálise de Gondomar, Gondomar, Portugal; 6-Clínica de Hemodiálise de Felgueira, Felgueiras, Portugal, 7- Department of Biological Sciences, Faculty of Pharmacy, University of Porto, Porto, Portugal; 8- UCIBIO, REQUIMTE, Faculty of Pharmacy, University of Porto, Portugal.

Background and aims

End-stage renal disease (ESRD) is a growing public health problem, given the increasing prevalence worldwide. It is estimated that by 2020 the number of ESRD patients will increase by about 60% when compared with the number of patients registered in 2005. Data from 150 countries showed that over 3 million patients were treated for ESRD worldwide by the end of 2012 and that the number of patients is growing faster than the world population (growth rate: 7%) (1). ESRD patients show a high mortality rate (2-4), which far exceeds the mortality rate found in the general population.

The success of renal replacement therapy depends on patients' adherence and persistence to the different aspects of the therapeutic strategy. Treatment adherence of the ESRD patient under dialysis can be monitored by biological and biochemical markers, namely through dialysis adequacy through urea kinetics level, residual kidney function, and blood pressure control. Furthermore, missing or shortening of the dialysis treatment can be noted by the dialysis staff. These factors, together, allow for the measurement of patient adherence to, and outcomes of, the dialysis strategy. Medication and dietetic adherence can be correlated to serum potassium and serum phosphate concentrations, blood urea nitrogen and interdialytic weight gain, and serum albumin concentration provides a characterization of dietetic status, although several others factors can affect these parameters. However, these biomarkers seem to be more effective and reliable in the evaluation of clinical outcomes than non-adherence.

In this work, we aimed to evaluate of the results of self-reported end-stage renal disease adherence questionnaire (PESRD-AQ) and its association with biomarkers of non-adherence.

Material and methods

We evaluated 185 Portuguese ESRD patients undergoing online–hemodiafiltration (OL-HDF) from three dialysis clinics (50.3% female, mean age of 66.44 ± 14.29 years old and an average dialysis vintage of 62.53 ± 58.04 months). Patients were under therapeutic dialysis three times per week for a duration of 3–5 hours. The aetiology of ESRD was diabetes in 71 (38.4%) patients, hypertension in 115 (62.2%) and both diabetes and hypertension in 49 (26.5%). This study has been approved by the ethics committees of the involved dialysis clinics. The patients were informed about the aim of this study and signed consent.

The inclusion criteria were: 1) Portuguese nationality, 2) receiving OL-HDF for three months or more, 3) 18 years of age or older, 4) independent with self-care activities.

Patients were considered to be adherent to the prescribed dialysis sessions if they responded "during the last months, I did not miss any dialysis treatment, and have not shortened my dialysis time in the last month" to questions 14, 17 and 18; adherent to the drug regimen if they responded "I did not miss my medicines during the past week" to question 26; adherent to fluid intake restrictions if they responded "all the time followed the fluid restriction recommendations during the past week" to question 31; and adherent to dietetic recommendations if they responded "all the time followed the diet recommendations during the past week" to question 46. Finally, patients that achieved the maximum total score of 1200 on the PESRD-AQ were considered globally adherent.

Statistical Analysis. All variables are reported as mean ± standard deviation, median (interquartile range) or proportions. Data were analyzed using the program SPSS 21.0 for Windows (SPSS, Inc., Chicago, IL). The normality of data was tested using the Kolmogorov-Smirnov test. Differences between groups were analyzed by using a Student's t-test or Mann-Whitney test, according to the results obtained in the Kolmogorov-Smirnov test. The association between categorical variables was evaluated using the chi-squared test or Fisher's exact test. Pearson or Spearman's rank correlation coefficients were used to evaluate relationships between sets of data. $P < 0.05$ was accepted as statistically significant.

Results

Using the PESRD-AQ results, we showed that 6.5% of our group of ESRD patients were not adherent to dialysis treatment, 15.7% were not adherent to medication, 50.3% were not adherent to fluid restrictions and 56.2% were not adherent to diet restrictions. Globally, 72.4% of our ESRD patients were classified as non-adherent to at least one aspect of the therapeutic strategy. When we compared the potential biological and biochemical markers of non-adherence between patients adherent to dialysis treatment and those considered to be non-adherent, we only found a trend for higher diastolic pressure ($p = 0.085$) in the non-adherent group of patients.

Table I – Comparison of sociodemographic data, and biological and biochemical markers of non-adherence between dialysis patients who were adherent and non-adherent to the different aspects of the therapeutic strategy, based on PESRD-AQ scores.

	PESRD-AQ total score			Dialysis treatment			Medication			Fluid restriction			Dietary restriction		
	Adherents (n=51)	Non-adherents (n=134)	P-value	Adherents (n=173)	Non-adherents (n=12)	P-value	Adherents (n=156)	Non-adherents (n=29)	P-value	Adherents (n=92)	Non-adherents (n=93)	P-value	Adherents (n=81)	Non-adherents (n=104)	P-value
Age, years	68.2±12.4	65.8±14.9	0.270	66.45±14.2	67.0±15.7	0.899	66.8±13.9	64.8±16.0	0.481	67.4±12.9	65.4±15.4	0.337	67.4±13.0	65.7±15.2	0.421
Gender, % male	52.9	48.5	0.624	50.3	41.7	0.767	48.7	55.2	0.550	**58.7**	**40.9**	**0.019**	49.4	50.0	1.000
Time under dialysis, months	60.0 (32.3–101.8)	40.5 (19.0–73.0)	0.132	48.0 (22.0–80.3)	35.0 (17.3–78.0)	0.671	48.0 (22.5–80.5)	44.0 (15.0–78.0)	0.627	55.0 (28.5–90.0)	37.0 (19.0–73.0)	0.113	51.5 (27.3–86.5)	40.5 (19.0–75.0)	0.374
URR, %	78.6±5.1	79.8±5.2	0.165	79.4±5.3	79.7±4.3	0.844	79.3±5.1	80.5±5.5	0.261	78.9±4.9	79.9±5.5	0.211	78.7±5.2	80.0±5.1	0.084
KTv	1.7±0.3	1.7±0.3	0.588	1.7±0.3	1.7±0.2	0.664	1.7±0.3	1.8±0.4	0.120	**1.6±0.3**	**1.7±0.3**	**0.049**	1.7±0.3	1.7±0.3	0.897
Diastolic pressure, mmHg	63.1±11.7	64.5±14.2	0.537	63.6±13.7	70.6±10.0	0.085	63.7±13.4	66.1±14.9	0.395	63.1±12.9	65.3±14.3	0.299	64.4±12.3	64.0±14.5	0.846
Systolic pressure, mmHg	133.8±20.6	136.0±20.8	0.516	135.8±21.2	133.4±10.1	0.478	135.2±20.5	138.0±22.3	0.501	134.2±20.5	136.8±20.8	0.389	134.1±19.9	136.5±21.2	0.439
Glucose, mg/dL *	159.3±64.6	161.3±63.9	0.908	159.8±61.5	176.0±103.3	0.625	159.9±60.7	167.6±90.7	0.767	163.5±57.3	158.6±68.9	0.761	155.7±68.9	164±59.9	0.574
Interdialytic weight gain, kg	2.0±0.8	2.2±0.8	0.268	2.1±0.9	2.0±0.6	0.663	2.1±0.9	1.9±0.7	0.234	**1.9±0.8**	**2.3±0.9**	**0.015**	2.1±0.8	2.1±0.9	0.652
Interdialytic weight gain, % of dry weight	3.1±1.1	3.1±1.2	0.968	3.1±1.2	3.1±0.7	0.870	3.2±1.2	2.8±1.0	0.144	2.9±1.1	3.3±1.2	**0.043**	3.1±1.1	3.1±1.3	0.761
Haemoglobin, g/dL	**11.8±1.7**	**11.1±1.5**	**0.007**	11.3±1.6	11.2±1.2	0.745	11.3±1.5	11.1±1.6	0.518	11.5±1.6	11.1±1.4	0.071	**11.6±1.6**	**11.1±1.5**	**0.017**
Ferritin, ng/mL	394.0 (267.0–571.0)	488.0 (238.0–679.1)	0.300	466.4 (254.3–665.9)	366.2 (177.8–697.1)	0.743	427.5 (238.8–673.5)	519.4 (305.5–663.8)	0.739	427.0 (235.4–703.0)	488.0 (252.0–666.0)	0.899	**386.8 (230.1–570.8)**	**533.5 (276.3–733.4)**	**0.015**
Albumin, g/L	4.0±0.3	4.0±0.3	0.930	4.0±0.3	3.9±0.4	0.481	3.9±0.4	4.0±0.4	0.311	3.9±0.3	3.9±0.3	0.974	3.9±0.3	4.0±0.3	0.431
Potassium, mmol/L	5.3±0.7	5.0±0.8	0.051	5.1±0.8	4.8±0.8	0.306	5.1±0.9	5.1±0.6	0.866	5.1±0.8	5.0±0.8	0.424	5.0±0.8	5.1±0.7	0.156
Phosphorus, mg/dl	4.4±1.2	4.1±1.1	0.191	4.2±1.2	3.9±0.9	0.382	4.2±1.2	4.1±1.2	0.792	4.2±1.2	4.2±1.2	0.922	**4.3±1.2**	**4.1±1.1**	**0.090**

*Data presented correspond only to diabetic dialysis patients.

ESRD patients classified as non-adherent to fluid restrictions showed a lower proportion of males, and higher KTv and interdialytic weight gain (kg and percentage of dry weight), when compared with those considered to be adherent to fluid restrictions. Moreover, ESRD patients classified as non-adherent to dietary restrictions showed higher ferritin serum levels, and lower haemoglobin concentrations when compared with those considered to be adherent to dietary restrictions. ESRD patients classified as non-adherent to at least one aspect of the therapeutic strategy also showed lower haemoglobin concentrations (table I), when compared with those classified as adherents.

We also found significant correlations between fluid restriction scores and interdialytic weight gain in kg ($r = -0.227$; $p = 0.002$) and in percentage of dry weight ($r = -0.202$; $p = 0.007$); and between dietary restrictions and haemoglobin concentration ($r = 0.150$; $p = 0.049$). In the non-adherent group of patients was found a trend ($p = 0.085$) to high diastolic pressure. Non-adherent to fluid restrictions patients showed higher KTv and interdialytic weight gain, when compared with those classified as adherent. Patients classified as non-adherent to dietary restrictions showed higher ferritin serum levels, and lower haemoglobin concentrations, when compared with those classified as adherent.

Conclusions

In conclusion, our results showed that PESRD-AQ is a valid tool to be used in dialysis patients for adherence evaluation, particularly to fluid intake recommendations.

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