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PREDICTORS OF DISABILITY IN HEMODIALYSIS PATIENTS

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Abstract

The aim of this study was to search for predictors of disability among patients treated with hemodialysis.

Material and methods: Disability was assessed with self-reports of activities by Katz, Nagi and Rosow-Breslau (R-B) scale in 134 hemodialysis patients in a cross-sectional study. Sociodemographic, clinical, nutritional and dialysis factors were investigated as influencing factors. Multiple logistic regression analysis was used to identify predictors associated with disability scores.

Results: Mean Katz, Nagi and R-B scores of the study group were: 4.67 ± 8.0, 9.96 ± 7.5, 3.84 ± 2.4, respectively. In the univariate analysis, women, patients who were older than 65, had diabetes, intradialytic hypotension, catheter as vascular access, sensor or loco-motor problems, carpal-tunnel syndrome, cerebrovascular disease and body mass index more than 31 kg/m^2, had at least one Katz activity impairment. In the multivariate regression model, the older age, female gender, carpal tunnel and catheter presence were the strongest independent predictive markers for Katz impairments. As for Nagi and R-B scales, presence of catheter emerged among the strongest predictors.

Conclusion: Many modifiable factors contribute to disability in hemodialysis patients. Interventions are needed before start of hemodialysis in order to unable development of disability during dialysis treatment.

Keywords: disability, dialysis, catheter, regression analysis, predictors

Introduction:

The etiology of poor functional status in hemodialysis patients is multifactorial. Visual impairment for diabetic patients, muscle weakness and osteoarticular impairment for non-diabetic patients require special efforts because of affected physical activity [1-5]. Combined with the therapy burden, these conditions result in highly impaired activity scores. Determination of modifiable factors among the predictors of disability might elicit a way to improve the physical abilities of dialysis patients. This study was designed to search for predictors of disability among patients treated with hemodialysis.

Material and methods:

We conducted a cross-sectional study of three scale assessments by Katz, Nagi and Rosow-Breslau (R-B) in 134 prevalent hemodialysis patients. Patients were included in the study if their age was > 18 and regular HD treatment performed at least 3 months prior to the study. Patients were excluded if they lacked the mental or physical capacity to communicate. Data was collected using medical histories and interviews for sociodemographic, nutritional, clinical indices and dialysis factors. Educational level was categorized as low with secondary school graduate or less. In addition, patients were classified according to the presence or absence of diabetes mellitus and intradialytic hypotension (IDH) - defined by the European Best Practice Guideline on Hemodynamic Instability, as a relative or an absolute decline in blood pressure, as well as the presence of specific symptoms, with a need for nursing [6]. The patients' physical activities were assessed with the Katz [7], Nagi [8] and R-B 8 scores. The scale scores were dichotomized to 0 (without impairment) or 1 (when at least one disabled activity was found by each scale). Nominal scores were used in the predictive analysis.

Data analysis

Statistical analysis was performed using the SPSS 16.0 for Windows. Descriptive data are presented as mean ± standard deviation (SD). Percentages are given for categorical variables. Multiple logistic regression analysis was carried out to identify factors that were significantly associated with at least

one impaired activity for each score - as dependent factors. A P-value of 0.05 or less was considered significant.

Results:

The sociodemographic, clinical, nutritional factors and dialysis variables of the dialysis patients are presented in Table 1. Mean Katz, Nagi and Rosow-Breslau (R-B) scores of the study group were: 4.67 ± 8.0, 9.96 ± 7.5, 3.84 ± 2.4, respectively. Walking disability and need of wheelchair, walker or bed was noted in 16% of patients, as shown on Figure 1. The percentage of ≥ 1 impaired activity in Katz, Nagi and Rosow-Breslau (R-B) were 41%, 95% and 85%, respectively.

Table 1. Sociodemographic, clinical, nutritional factors and dialysis variables

Age (years)	56.61 ± 13.0
Dialysis vintage (months)	87.18 ± 78.76
Low educational level	45 (34%)
Men	71 (53%)
Diabetes (%)	30 (22%)
Carpal tunnel Syndrome	23 (17%)
Intradialytic Hypotension (IDH)	26 (19%)
Body mass index (kg/m²) (BMI)	24.7 ± 6.4
Central venous catheter (CVC)	16 (12%)
Cardiovascular disease (CVD)	69 (51%)
Cerebrovascular incident (CVI)	34 (25%)
Locomotor disorder	90 (67%)
Sensory disorder	17 (13%)

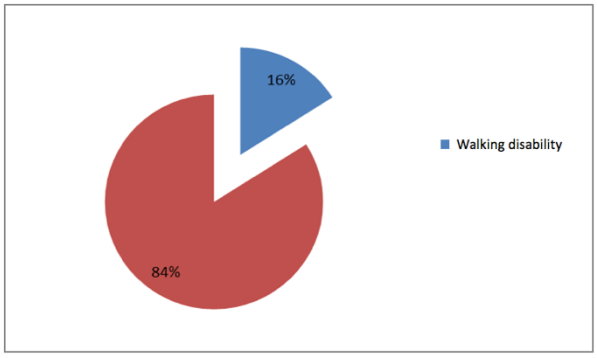

Figure 1. Walking disability among prevalent dialysis patients

Predictive analysis

In the univariate analysis presented in Table 2, women, patients who were older than 65, had diabetes, intradialytic hypotension, catheter as vascular access, sensor or locomotor problems, carpal-tunnel syndrome, cerebrovascular disease and body mass index more than 31 kg/m^2, had at least one Katz activity associated impairment. For the Nagi disability the association was significant in less educated patients, and for R-B scores it was the presence of CVD.

Table 2. Univariate logistic analysis of disability predictors

Variable	Katz	NagI	Rasow-Brestau
Gender	0.002	NS	NS
Age >65 years	0.010	NS	NS
Diabetes	0.019	NS	NS
Cardiovascular disease	0.001	NS	0.039
Catheter	0.007	NS	NS
Sensory disorder	0.01	NS	NS
Cerebrovascular Insult	0.0001	NS	NS
Locomotor disorder	0.0001	NS	NS
Carpal tunnel sy.	0.038	NS	NS
Intradialytic hypotension	0.028	NS	NS
Education	0.047	0.0001	NS
Body Mass Index >31kg/m2	0.030	NS	NS

In the multivariate regression model, the older age, female gender, carpal tunnel and catheter presence were the strongest independent predictive markers for Katz impairments. As for Nagi and R-B scales, presence of catheter emerged among the strongest predictors (Table 3).

Table 3. Multivariate analysis of Katz disability predictors

Variable	Katz – daily activities ≥ 1 disability Odds Ratio 95% CI	Sig
Female	7.3 : [0.39 - 2.4]	0.007
Age over 65 years	6.5 : [- 3.15 - - 0.036]	0.01
Low education	9.1 : [- 4.43 - - 0.95]	0.02
Catheter	3.7 : [- 3.15 - - 0.036]	0.055
Carpal tunnel sy.	3.46 : [- 2.66 - - 0.068]	0.063
	R square 0.54	0.0001

Discussion

This cross-sectional study provided several observations about disability in our patients on hemodialysis. The prevalence of disability ranged from 41-83% and was similar to other studies [4,5]; it was more affected in Katz activities than in Nagi and R-B ones. This high rate is due to diabetes and other comorbidities [5], particularly connected to CVD and history of CVI [9]. With respect to sociodemographic variables, we found that female and less educated patients were more disabled in daily activities than others, as shown in other studies [2,3]. The dialysis therapy brings a huge burden to patient's life. Hemodialysis via a catheter is already found to be associated with significantly lower quality of life scores [10], and this association was detected in patients of the presented study in respect of disability scores. The IDH and carpal tunnel syndrome [11] were worsening factors of disability and for amyloidosis it is known to be improved by high flux haemodialysis [12]. Nutritional factors affect physical abilities in dialysis patients. In our study patients with obesity showed marked disabilities, but the significance of the association was lost in the last statistical model, implying that other factors had higher impact.

In conclusion, deteriorated physical abilities in hemodialysis patients are predicted by age, gender and dialysis comorbidities. Interventions on modifiable factors are needed in order to provide less disability of dialysis patients.

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