

Prevalence and determinants of frailty in end-stage renal disease under online-hemodiafiltration

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Introduction

Frailty is a clinical condition characterized by a significant decline in an older person's ability to carry out activities of daily living and comprises changes associated with ageing, chronic disease and lifestyle. Frailty is highly prevalent in people older than 65 years (prevalence rates range from 7 to 16.3%) and this prevalence tends to increase with age. It is associated with the accumulation of age-related defects in different physiological systems, decreasing physiological reserves, increasing vulnerability to stressors, and the risk of falls, hospitalization, institutionalization and death. Moreover, frailty has been associated with adverse outcomes such as physical limitations, cognitive function impairment and low quality of life. There are also physical and psychological components described as associated with frailty, including weight loss, fatigue, resistance decrease, ambulation difficulties, comorbidities and polypharmacy.

An increasing proportion of end-stage renal disease (ESRD) patients under dialysis was observed with increasing age, which is also associated with physiological decline. Frailty is a common complication in elderly patients with ESRD under dialysis, which is strong risk factor for low quality of life, morbidity, and mortality. There are several factors that may contribute to the development of frailty in ESRD patients, such as metabolic disturbances, enhanced inflammatory and oxidative stress associated to vascular access type, clinical infections, periodontal diseases and water quality.

This work aimed to evaluate the prevalence of frailty, and its association with sociodemographic, clinical and biochemical markers in a group of ESRD patients under online-hemodiafiltration.

Methods

We performed a cross-sectional study with 97 ESRD patients (39.2% males; 69.86 ± 14.03 years old), who receive dialysis three times per week. After informed consent, data about sociodemographic variables and comorbidities, duration of dialysis, as well as hematological, iron status, dialysis adequacy, nutritional and inflammatory markers were evaluated as possible associated variables. The classification of the ESRD patients on frailty was performed using the Tilburg Frailty Indicator (TFI, Gobbens et al., 2010).

Results

There was a prevalence of frailty of 62.8% in our sample, and a significantly higher proportion of women (male - 45.5%, female - 72.0%, $p = .021$). We found a weak significant correlation (Fig. 1) between age and physical frailty ($r = .271$; $p = .009$). However, no association was found between age and cognitive or social frailty scores.

Patients with two or more chronic diseases showed higher prevalence of frailty (72.2% vs. 46.9%; $p = .023$). Moreover, we also found that ESRD patients living with a partner (41.0% vs. 80.9%; $p < .001$) as well as those eligible for renal transplant (70.4% vs. 44.8%; $p = .033$) showed lower prevalence of frailty.

Multiple regression analysis (table I) identified civil status ($\beta = .260$; $p = .013$), two or more chronic disease ($\beta = -0.302$; $p = 0.004$) and not being eligible for renal transplant ($\beta = -0.209$, $p = .040$) as independent variables significantly associated with global frailty score ($R^2 = .247$).

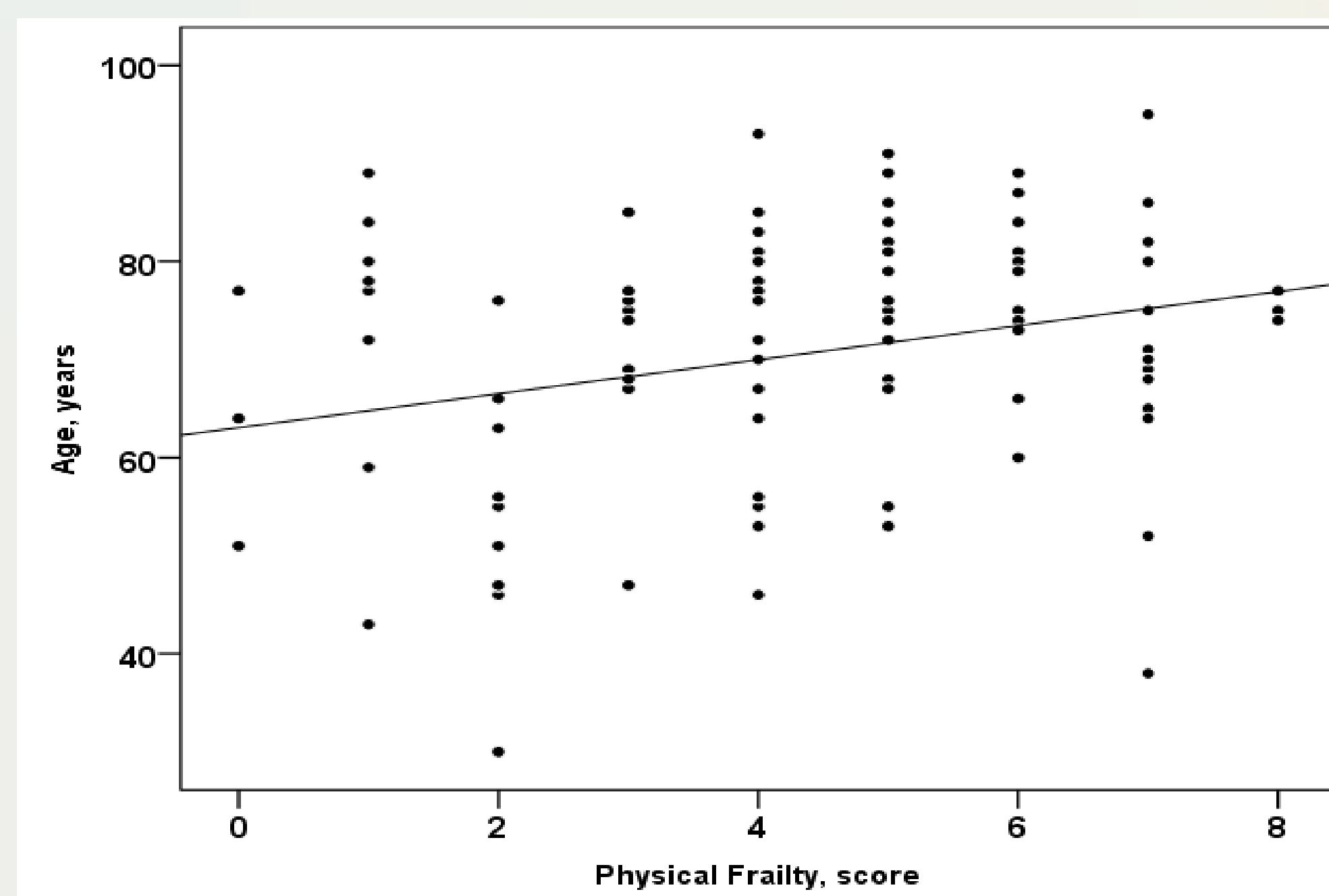


Fig. 1 - Weak significant correlation between age and physical frailty ($r = .271$; $p = .009$).

Table I - Multiple regression analysis.

	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	Beta	t
(Constant)	8.409	1.879		4.475
Civil Status	1.611	.633	.260	2.547
Two or more chronic diseases	- 1.939	.646	- .302	-3.001
Eligible for renal transplant	- 1.349	.648	- .209	-2.083

Discussion

Our results confirm that frailty is a highly prevalent condition in ESRD patients under dialysis. Frailty is not determined by the age of the patients. Rather it is explained by the severity of the patient clinical condition, his/her treatment options and the existence of a nuclear familial support structure.

Conclusion

As mortality is greater in frail ESRD patients, further research is required to identify care needs of this subgroups, specially within the familial domain.

References

- [1] Collard, R. M., Boter, H., Schoevers, R. A., & Oude Voshaar, R. C. (2012). Prevalence of frailty in community-dwelling older persons: A systematic review. *Journal of the American Geriatrics Society*, 60(8), 1487–1492. doi:10.1111/j.1532-5415
- [2] Fried, L. P., Tangen, C. M., Walston, J., Newman, A. B., Hirsch, C., Gottdiener, J., ... McBurnie, M. A. (2001). Frailty in older adults: Evidence for a phenotype. *J Gerontol A Biol Sci Med Sci.*, 56(3), 146–156.
- [3] Iyasere, O. U., Brown, E. A., Johansson, L., Huson, L., Smeeth, J., Maxwell, A. P., ... Davenport, A. (2016). Quality of life and physical function in older patients on dialysis: A comparison of assisted peritoneal dialysis with hemodialysis. *Clinical Journal of the American Society of Nephrology*, 11(3), 423–430. doi:10.2215/CJN.01050115
- [4] McAdams-DeMarco, M. A., Ying, H., Olorundare, I., King, E. A., Desai, N., Dagher, N., ... Segev, D. L. (2016). Frailty and health related quality of life in end stage renal disease patients of all ages. *The Journal of Frailty & Aging*, 5(3), 174–179. doi:10.14283/jfa.2016.106.
- [5] Musso, C. G., Jauregui, J. R., & Núñez, J. F. M. (2015). Frailty phenotype and chronic kidney disease: A review of the literature. *International Urology and Nephrology*, 47(11), 1801–1807. doi:10.1007/s11255-015-1112-z