

## Introduction

Dialysis is associated to high rates of depression (between 25% and 70%) [1-4] and anxiety [5,6]. Depression has a strong positive correlation with mortality rates and a strong negative correlation with adherence to dialysis treatment [7]. Anxiety can be very high in first session of dialysis treatment [5]. A systematic review showed that for dialysis patients psychosocial well-being is more important than physical functioning [8]. Among negative psychological impacts associated to dialysis are weakening of self-efficacy perception, body-image impairment, memory loss, concentration ability, sexual dysfunction and sleep disorders [9].

There is evidence regarding the relationship between depression and immunological markers, pointing to the need of looking at depression as a mediating variable in reducing morbidities and mortality. However, further research is needed in order to understand patterns of association with psychological variables.

This work evaluated the prevalence of depression and anxiety in end-stage renal disease (ESRD) patients and their associations with socio-demographic, clinical and biological data.

## Methods

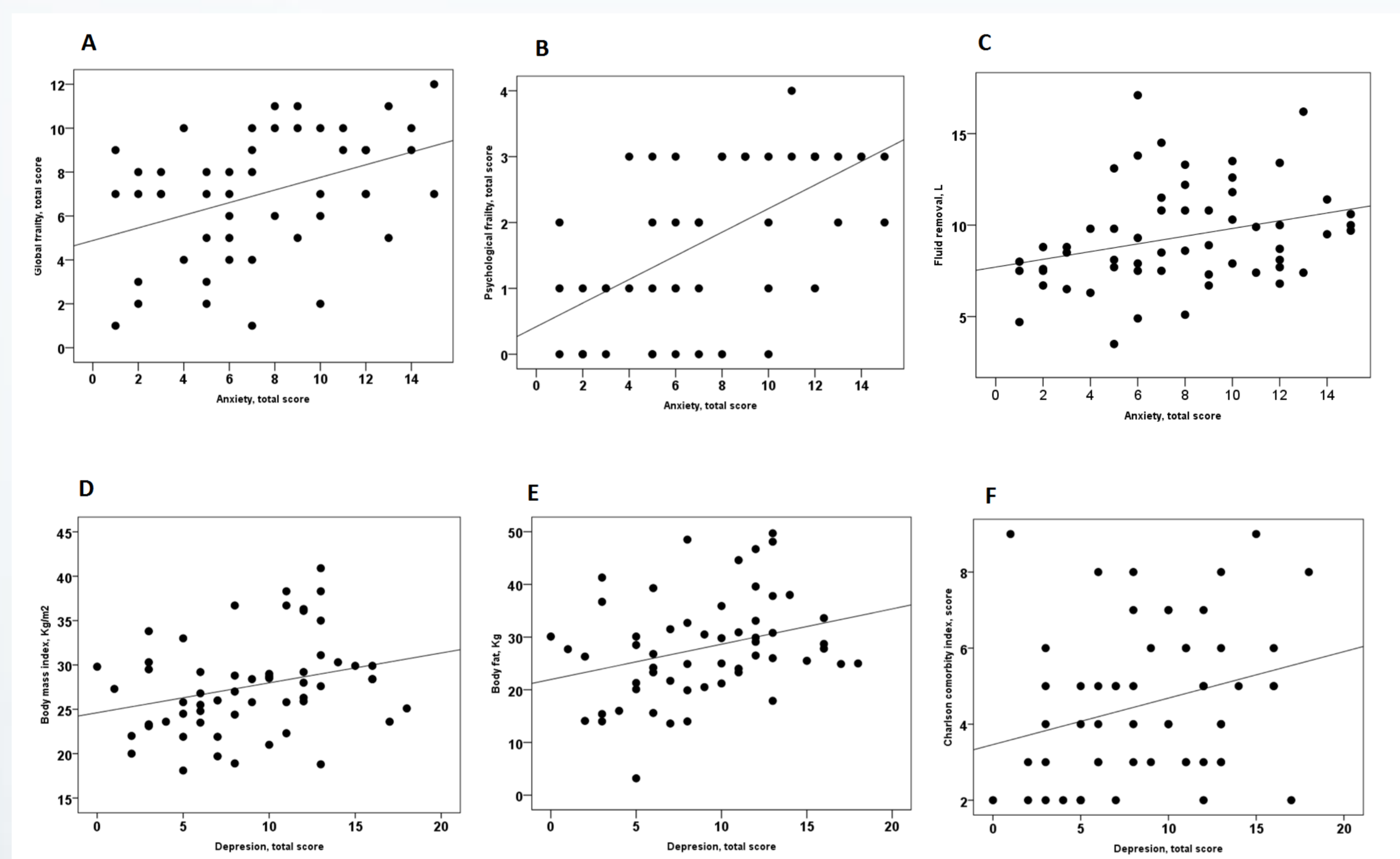
We conducted a cross-sectional study with 97 ESRD patients under online-haemodiafiltration (OL-HDF) (39.2% males; 69.86 ± 14.03 years old). All patients of the Nephrocare Maia Clinic were invited to participate. Patients with cognitive impairment were excluded. After informed consent, depression and anxiety were evaluated using the Hospital Anxiety and Depression Scale (HADS, Zigmond & Snaith, 1983). Sociodemographic data, as well as, comorbidities, hematological data, iron status, dialysis adequacy, nutritional and inflammatory markers were collected from patient's records.

## Results

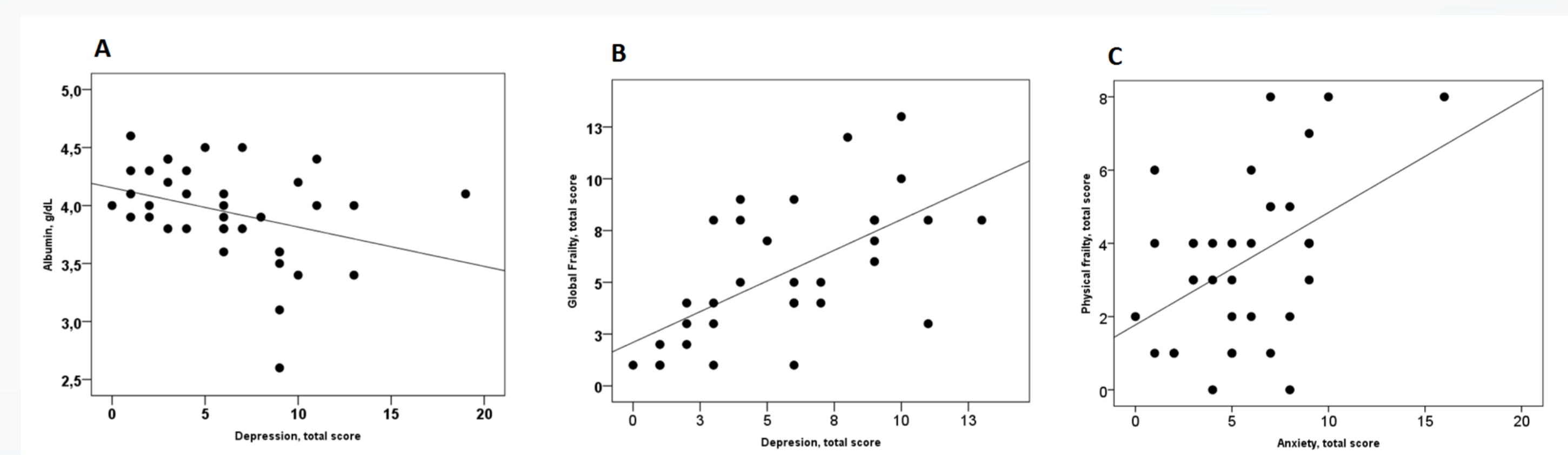
Results showed that 51% of the patients presented symptoms of depression, 30% of which reached moderate or severe symptoms. The prevalence of anxiety was lower, with 27.8% of the patients reporting mild symptoms, and 16.5% reporting moderate or severe symptoms of anxiety. Of the total sample, there was a prevalence of 11.0% of comorbidity, with moderate or severe symptoms of both anxiety and depression.

The pattern of associations between the variables was different according to gender. Comorbidity was significantly higher in female patients. Anxiety was associated to less fluid removal levels, and with high global and psychological frailty (Fig. 1A-1C). Older women with lower education level reported higher levels of depression. Also in women, depression was associated with high body mass index and fat issue mass, and with lower systolic and diastolic predialysis blood pressure. Depression in women was related to high Charlson Comorbidity Index score (Fig. 1D-1F).

In men, a negative association was found between depression and albumin serum levels. A positive association was found between depression and frailty (global, psychological and physical). Anxiety was associated to perceived physical frailty in men (Fig. 2A-1C).



**Fig. 1** – In female ESRD patients, an association between anxiety and comorbidities (A), psychological frailty (B) and fluid removal (C) was found. We also found an association between depression and body mass index, body fat and comorbidities.



**Fig. 2** – In male ESRD patients, an association between depression score and albumin serum levels (A), global frailty (B) and physical frailty (C) was found.

## Discussion

ESRD patients presented higher prevalence of depression compared to anxiety, confirming previous findings [1-3].

Results suggest that frail ESRD patients are a specially vulnerable subgroup that may require a differentiated care.

The relations between depression and anxiety with important clinical and treatment parameters call for further studies that clarify the underlying processes. Strategic options are needed to improve the diagnosis and treatment of psychological disorders, which can have a potential important impact in patient's quality of life and clinical outcomes.

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