ASSOCIATION BETWEEN VITAMIN D AND THYROID HORMONE LEVELS WITH DEPRESSIVE SYMPTOMS IN HEMODIALYSIS PATIENTS

EDUARDA NEUTZLING DRAWANZ[1]; NATHÁLIA PASSOS MOURA[2]; CAROLINE HELEN GONÇALVES DOS SANTOS; THIAGO FALSON SANTANA; ALINE LONGONI DOS SANTOS [2], ADRIANO MARTIMBIANCO DE ASSIS[3]

[1] *Universidade Católica de Pelotas – e-mail do autor*

[2] *Universidade Católica de Pelotas – nathalia.moura@sou.ucpel.edu.br; caroline-helen@hotmail.com; thiago.santana@sou.ucpel.edu.br; aline_longoni@hotmail.com*

[3] *Universidade Católica de Pelotas – PPG Saúde e Comportamento - adriano.assis@ucpel.edu.br*

1. INTRODUCTION

Chronic Kidney Disease (CKD) has gained global attention over the last decade. In Brazil, an estimated 3 to 6 million people are affected, with a mean prevalence of 8.9% (ELSA) (de SOUSA, 2019). As renal function declines, processes such as electrolyte and pH balance, blood pressure regulation, and toxin clearance are disrupted, contributing to hormonal imbalances and metabolic disturbances (ZOCCALI, 2017; KIM D, 2017).

Vitamin D deficiency is common in CKD, leading to immune dysfunction and mood disorders like depression and anxiety (TAHERINIYA, 2021). Similarly, reduced kidney clearance affects metabolite accumulation and thyroid function, which is also crucial for neuropsychological functions, including energy metabolism, cognition, and mental health, with hypothyroidism potentially contributing to depressive symptoms (TANG R, 2019; TALAEI A, 2017).

Given the diverse impacts of CKD, it is necessary to have a broader view of the patient, in order to consider the different origins of the symptoms reported so that management is assertive. This integrated perspective could provide valuable insights into underlying mechanisms that contribute to mental health alterations in this population, helping to uncover clinically relevant contributors to depressive symptomatology. Thus, the present study aims to find an association between the role played by vitD and THs with depressive symptoms in patients with CKD, undergoing hemodialysis.

2.METODOLOGY

This cross-sectional study was approved by the Research Ethics Committee of the Catholic University of Pelotas under registration number 7.297.849. Patients with CKD undergoing hemodialysis at HUSFP/UCPel in February 2025, aged 18 years old or more, from both sexes, not pregnant and receiving treatment from the public health system were included. Peritoneal dialysis patients were excluded. The total sample comprised 91 patients.

Socioeconomic classification was assessed using the *Associação Brasileira de Empresas de Pesquisa* (ABEP) questionnaire (KAMAKURA, 2016), and depressive symptoms were assessed using the Beck's Depression Inventory (BDI-II) (NADORT E, 2022). To assess vitamin D and thyroid hormone levels, 10mL blood samples were collected. The measurement of 25-hydroxyvitamin D (calcidiol), thyroid-stimulating hormone (TSH), thyroxine (T4), and triiodothyronine (T3) was carried out by

chemiluminescence. Statistical analysis was performed using IBM SPSS Statistics software, version 20.0 (IBM Corp., Armonk, NY, USA).

3.RESULTS AND DISCUSSION

Among the 91 patients, 50,5% were females and the mean age was 54,64 ± 15,27 years. Also, 63,7% individuals were classified as white; 56,1% of participants had a low level of education, and most participants belonged to class D, representing 56,0% of the total sample size.

Vitamin D deficiency was observed in 20,9% of patients and 29,7%, as insufficient. Among patients with depressive symptoms, 40,0% had calcidiol deficiency, versus 14,1% of those without, reinforcing the potential link between vitamin D *status* and the presence of depressive symptoms (p = 0,012). This association, especially among women, suggests a possible role of vitamin D in mood regulation, not only through inflammatory and neurochemical pathways (MO H, 2023), but also through differences in body composition (MUSCOGIURI, 2019, as well as nutritional aspects (MUSCOGIURI, 2019) and social and self care behaviors (MUSCOGIURI, 2019).

Hypothyroidism was present in 8.8% of participants and was significantly associated with higher depressive symptom scores (p = 0,024). These findings reinforce the potential role of thyroid hormones in mood regulation and are compatible with known CKD pathophysiological changes, such as deiodinase enzymes dysfunction (WANG WL, 2019) and the chronic inflammatory state triggered by uremic toxins (De DONATO, 2022).

4. CONCLUSION

Despite the promising results and their potential clinical implications, several limitations inherent to this study design must be considered, such as its cross-sectional nature, which prevents the possibility of establishing a causal link. Also, the population available for the study was selected by convenience and was somewhat limited, as it included only patients from the public health system. Yet, besides the aforementioned limitations, the results highlight the potential of integrated and multidisciplinary care as complementary strategies in the psychosocial care of hemodialysis patients. As elaborated, longitudinal studies and future interventions are needed to elucidate each mechanism and assess the direct clinical impact of each approach.

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