Original article

Multidimensional frailty and its association with quality of life and disability: A cross-sectional study in people with multiple sclerosis

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ABSTRACT

Background: People with multiple sclerosis (pwMS) have a high risk of frailty. We aim to evaluate frailty using the Tilburg frailty indicator (TFI), a multidimensional self-reported questionnaire, and to explore its relationship with autonomy, quality of life (QoL), and disability.

Methods: All the patients with MS enrolled completed TFI (frail when TFI score $\geq$ 5 points), the Groningen Activities Restriction Scale to evaluate autonomy, and the Multiple Sclerosis Impact Scale-29 to evaluate QoL. We collected the Expanded Disability Status Scale (EDSS) score, age and gender. Data were analysed using descriptive analyses, hierarchical multiple regression, and ANCOVA.

Results: A total of 208 pwMS (mean age 44 years, SD=11; 75% women; 89.4% relapsing-remitting) were enrolled. The mean TFI total score was 5.7 points (SD=3.0; range 0–14), with the 62.5% of participants exhibiting frailty. After controlling for age and gender, the EDSS score was associated with the total (β=0.469; R^2=0.255; p<0.001) and the physical (β=0.571; R^2=0.349; p<0.001) frailty score, with an explained variance of 25.5% and 34.9%, respectively. No relationships between the EDSS and psychological and social frailty domains were detected. The proportion of frail patients with EDSS $\geq$ 6.0, EDSS within 3.5–5.5, and EDSS $\leq$ 3.0 was 91.7%, 83.3%, and 66.0%, respectively. Frail patients exhibited higher autonomy impairment ($p = 0.017$) and worse QoL (p<0.001).

Discussion: We found a high frequency of frail patients with MS. Frailty is more common in patients with higher disability, but it affects also those with low EDSS. In people with MS frailty could be influenced by factors other than disability.

1. Introduction

Multiple sclerosis (MS) is the most common cause of disability in young people, and its prevalence is increasing worldwide (Dobson and Giovannoni, 2019). Performing an "all-inclusive" routine evaluation of people with MS (pwMS) presents difficulties due to the complexity of the disease in terms of visible and invisible symptoms, different clinical courses, comorbidities, and the burden of disease-modifying and symptomatic treatments, which have a negative impact on daily activities, social life, and work (Reade et al., 2012). Moreover, pwMS have impaired coping strategies, particularly when social support and problem-solving are required (Lorefice et al., 2018).

The Expanded Disability Status Scale (EDSS) is an internationally recognised instrument used to measure disability in pwMS (Kurtzke, 1983). Unfortunately, this scale has several limitations. In particular, it is focused on mobility and does not appropriately take into account invisible symptoms and the impact of the disease in social and work-related activities. To bridge this gap, the use of patient-reported outcomes (PRO) has generated increasing interest in the last decade, both for daily medical practice and in clinical studies (Brichetto and Zaratin, 2020).

Furthermore, frailty evaluation is increasingly performed in many medical fields. Frailty is defined as a decline in functioning across multiple systems, and is associated with increased mortality,

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