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Measurement invariance and latent mean differences across Basque and Spanish versions of the Multidimensional Frailty Scale (MFS)

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Keywords

frailty, older adults, measurement invariance

Abstract

The concept of frailty was first introduced in medical literature to explain differences in health status among individuals of the same chronological age. Since then, it has evolved into a key concept in geriatrics and gerontology, fostering a growing body of research on its characteristics and implications. Frailty is generally defined as a state of increased vulnerability to external and internal stressors, significantly heightening the risk of adverse health outcomes such as falls, cognitive impairment, physical disability, hospitalization, and mortality. Although several instruments have been developed to assess frailty, most fail to encompass all its dimensions and lack satisfactory psychometric properties. Additionally, as stated in the guidelines of the International Test Commission (2017), comparative statements about respondent performance levels in two language groups should not be made unless measurement invariance has been established for the test scores being compared. Therefore, the aim of this study was to analyze the measurement invariance across languages of a new instrument called Multidimensional Frailty Scale, originally developed in Basque (Hauskortasun Multidimentsionalaren Eskala, HME) and Spanish (Escala de Fragilidad Multidimensional, EFM), to assess frailty in older adults, and to examine latent mean differences between both groups. The sample consisted of 484 individuals aged 65 and older (58.5% for the Spanish version and 41.5% for the Basque version). The MFS is a 29-item scale designed to assess multidimensional frailty, encompassing five dimensions: physical, cognitive, affective, social, and environmental frailty. Multi-group confirmatory factor analysis was used to evaluate the measurement invariance of the five EFM dimensions across languages. The results showed that the constrained model, with equivalent thresholds and factor loadings for Spanish and Basque respondents, demonstrated an adequate fit (CFI=0.984; TLI=0.984; RMSEA=0.039 [90% CI: 0.034-0.045]). Thus, measurement invariance across languages was successfully demonstrated. Additionally, latent mean differences indicated that participants who completed the Basque version of the instrument scored significantly lower in physical and affective frailty compared to those who completed the Spanish version. The magnitude of the difference between these means, calculated using Cohen's d, ranged from small to moderate. This study provides evidence of measurement invariance across the Spanish and Basque versions of the MFS, ensuring that frailty is assessed equivalently in both languages. These findings contribute to the validation of a robust assessment tool for frailty in aging populations, supporting its use in both clinical and research settings.

Primary authors: GOROSTIAGA, Arantxa (University of the Basque Country UPV/EHU); LAMEIRINHAS, Joanes (University of the Basque Country UPV/EHU); ETXEBERRIA, Igone (University of the Basque Country UPV/EHU); BALLUERKA, Nekane (University of the Basque Country UPV/EHU); ALIRI, Jone (University of the Basque Country UPV/EHU)

Presenters: GOROSTIAGA, Arantxa (University of the Basque Country UPV/EHU); LAMEIRINHAS, Joanes (University of the Basque Country UPV/EHU); ETXEBERRIA, Igone (University of the Basque Country UPV/EHU); BALLUERKA, Nekane (University of the Basque Country UPV/EHU); ALIRI, Jone (University of the Basque Country UPV/EHU)

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