Mathematical modelling of frailty and dependency in basic activities of daily living in general population aged 70 years or over.

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Frailty is a progressive age-related decline in physiological systems that results in decreased reserves of intrinsic capacity. It confers extreme vulnerability to stressors and increases the risk of a range of adverse health outcomes. Frailty is a predictor of mortality, disability, mobility loss, institutionalization, falls and cardiovascular disease. There is a relationship between frailty, disability and comorbidity, but between 23% and 26% of the frail elderly people do not have disability or comorbidity.

The physical frailty and the two stages of disabilities (disability in instrumental and basic activities of daily living) follow a hierarchy along a continuum. There are two conceptual models of frailty: physical frailty model based on Fried’s criteria, and the deficit accumulation model. The frailty indices are derived from the deficit accumulation model. Frail-VIG index is a frailty index based in the comprehensive geriatric assessment (CGA, VIG in Spanish). The CGA is considered gold standard for management of frailty in elderly people. This index is composed with variables recorded during the usual clinical evaluation process. Through the Frail-VIG index we establish a situational diagnosis of the patient based on severity of the frailty. This allows the patient to be informed in order to agree with him on the health objectives. Mild frailty can be reversed. Short Physical Performance Battery (SPPB) is an objective assessment tool for evaluating lower extremity functioning in elderly people. SPPB does not fit into the conceptual frailty models mentioned, but it is widely used in the clinical setting for the diagnosis and staging of frailty.

There are multiple factors associated with frailty and dependency, but predicting who will be frail or dependent is poorly studied in clinical settings. We have developed predictive models that allows knowing the probability of being frail (according to the Frail-VIG index and the SPPB) or dependent for basic activities of daily living (using the Barthel Index) at a given age, according to clinical and sociodemographic variables.