

GAMLSS models to explore the use of health services in community-dwelling older adults, according to frailty

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Frailty in older adults is a predictor of survival and other health outcomes. It is known that other currently used health indicators, like the burden of the disease, and the number of prescribed drugs are related with a greater use of health resources, but they alone are not sufficient in predicting the provision of health care services for older people. Frailty, measured through a functional performance test, could play a key role as a relevant health indicator. Therefore, the aim of this study was to explore the use of a wide range of health services in community-dwelling older adults, according to their frailty condition. Due to the non-normally distributed nature of these kind of data, generalized additive models for location, scale and shape (GAMLSS) were used seeking to find the best fit distribution to fit the data.

The GAMLSS models for count outcomes were performed for the number of contacts with the general practitioner and primary care nurse; visits to specialists; visits to emergency rooms; and hospital admissions. All models were adjusted for sex, polypharmacy and age-adjusted Charlson Comorbidity Index. The health region was included as a random effect, and the follow-up time as an offset parameter. All fixed effects were considered to model all parameters: μ , the location parameter; σ , the scale parameter; and shape parameters, ν , skewness and τ , kurtosis, respectively. For each type of service use, the distribution that best fitted the data was chosen, based on the generalized Akaike information criterion (GAIC). Logistic regressions were also performed for the dichotomous variables.

The results of the best regression models, showed that frailty was significantly associated with the utilization of every health service considered. The negative binomial distribution type II was the distribution that best fitted most of the count outcomes, except for the general practitioner visits for which the zero-inflated negative binomial distribution, type I, was chosen. The highest IRR was observed for the visits to a primary care nurse 1.5(1.3, 1.6), indicating that frail individuals visited these nurses almost more times over a year than robust ones. And they were also more likely to visit an emergency room or be hospitalized (OR 1.3(1.0, 1.6) and 1.4(1.1, 1.8), respectively).

The GAMLSS models allows for examining not normally distributed complex data, identifying statistically significant factors related with the studied outcome, not only for location parameter.

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