A New Complexity Measure to Classify Ambulatory Patients in Rehabilitation Facilities for Financing Purposes

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The improvement of living conditions associated with medical advances in the treatment and prevention of many diseases has led to changes characterized by increased longevity and different epidemiological public health profiles. These changes are the result of the evolution in the treatment of diseases that have been becoming less mortal and more chronic. Many of these conditions conduct to the inability to perform the Activities of Daily Living (ADL) which in turn lead to disability and dependence. National Health Systems (NHS) face additional challenges and must respond by reorganizing institutions, resources and financing, in order to provide care in agreement with a new pattern of population's needs. The dimension of complexity in ambulatory rehabilitation are not only related to the etiology of the disease but also with the level of dependency and the patient's characteristics. The main objective of this research is to create a new indicator (using the International Classification of Function-ICF) based on a case mixed group function, to determine the patient complexity level and the respective affectation of resources. The complexity level will be used as a proxy of care needs to find homogeneous groups of patients. Classification variables from a sample of episodes were collected in a retrospective manner. The question that arises is how to tackle such a heterogeneous population. In this study we used a fuzzy clustering approach to data analysis, namely a grade of membership (GoM) representation of data. Having noted a hierarchical structure of fuzzy clusters, we were able to rank individuals by complexity and adjust the payment accordingly. In addition, the achieved results allow determining the complexity of new inpatients by means of a linear regression of the classification variables.

Key Words: Classification, Fuzzy methods, Grade of membership, Complexity measure.