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Dynamic monitoring of the effects of adherence to medication on survival in Heart Failure patients: a joint modelling approach exploiting time-varying covariates

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Abstract

Adherence to medication is the process by which patients take their drugs as prescribed, and represents an issue in pharmacoepidemiological studies. Poor adherence is often associated with adverse health conditions and outcomes, especially in case of chronic diseases such as Heart Failure (HF). This turns out in an increased request for healthcare services, and in a greater burden for the healthcare system. In recent years there has been a substantial growth in pharmacotherapy research, aimed at studying effects and consequences of proper/improper adherence to medication both for the increasing awareness of the problem and for the pervasiveness of poor adherence among patients. However, the way adherence is computed and accounted for into predictive models is far from being informative as it may be. In fact, it is usually analysed as a fixed baseline covariate, without considering its time-varying behaviour. The purpose and novelty of this study is to define a new personalized monitoring tool exploiting time-varying definition of adherence to medication, within a joint modelling approach. In doing so, we are able to capture and quantify the association between the longitudinal process of dynamic adherence to medication with the long-term survival outcome. Another novelty of this approach consists of exploiting the potential of healthcare administrative databases in order to reconstruct the dynamics of drugs consumption through pharmaceutical administrative registries. In particular, we analysed administrative data provided by *Regione Lombardia - Healthcare Division* related to patients hospitalized for Heart Failure between 2000-2012.

Key-words: Adherence to medication; Heart Failure; Joint Models; Pharmacotherapy; Time-varying covariates.

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