Pattern-Mixture model of the Cox proportional hazards model with missing binary covariates

Tae-Mi Youk*
Korea University, Seoul, Korea xoal84@korea.ac.kr

Juwon Song
Korea University, Seoul, Korea jwsong@korea.ac.kr

When fitting the Cox proportional hazards model with missing covariates, it is inefficient to exclude observations with missing values in the analysis. Furthermore, if the missing-data mechanism is not Missing Completely At Random (MCAR), it may lead to biased parameter estimation. Many approaches have been suggested to handle the Cox proportional hazards model when covariates are sometimes missing, but they are based on the selection model. This paper suggests an approach to handle Cox proportional hazards model with missing covariates by using the pattern-mixture model (Little, 1993). The pattern-mixture model is expressed by the joint distribution of survival time and missing-data mechanism. In the pattern-mixture model, many models can be considered by setting up various restrictions, and different results under various restrictions indicate sensitivity of the model due to missing covariates. A simulation study was conducted to show the sensitivity of parameter estimation under different restrictions in pattern-mixture model.

Key Words: survival time, missing-data mechanism, restrictions, sensitivity analysis