Different Sampling Schemes for Semi-Parametric Frailty Model

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Abstract : Frailty model is a survival model that takes into account the unobserved heterogeneity for exploring the relationship between the survival of an individual and several covariates. In the recent years, proposed survival models become more complex and this feature causes convergence problems especially in large data sets. Therefore selection of sample from these big data sets is very important for estimation of parameters. In sampling literature, some authors have defined new sampling schemes to predict the parameters correctly. For this aim, we try to see the effect of sampling design in semi-parametric frailty model. We conducted a simulation study in R programme to estimate the parameters of semi-parametric frailty model for different sample sizes, censoring rates under classical simple random sampling and ranked set sampling schemes. In the simulation study, we used data set recording 17260 male Civil Servants aged 40–64 years with complete 10-year follow-up as population. Time to death from coronary heart disease is treated as a survival-time and age, systolic blood pressure are used as covariates. We select the 1000 samples from population using different sampling schemes and estimate the parameters. From the simulation study, we concluded that ranked set sampling design performs better than simple random sampling for each scenario.

Keywords : frailty model, ranked set sampling, efficiency, simple random sampling

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