

Comparison on modelling the relative risk estimation: Bayesian study

ABSTRACT

The estimation of the disease incidents was previously analyzed using a classical approach. However, this approach features large outlying relative risks and considered as misleading due to several major problems. Some approaches such as the hierarchical Bayesian method have been adopted in the literature in order to overcome these problems. The purpose of this study is to compare between hierarchical Bayesian models that improve the relative risk estimation. The focus lies on examining the performance of different sets of densities via monitoring the history graphs, estimating the potential scale reduction factors and conducting sensitivity analysis for different choice of prior information. The best model fit is accomplished by conducting a goodness of fit test. The study is applied on Scotland lip cancer data set. The results show that for models with large number of parameters, more iteration is needed to achieve the convergence. The study also shows that diagnostic test and sensitivity analysis are important to decide about the stability and the influence of the choice of the prior densities. The DIC results were in line with the previous results and provide a good method of comparison.

Keyword: Hierarchical Bayesian models; Relative risk; Potential scale reduction; Sensitivity analysis; Convergence; Prior densities; DIC