

Priors comparison in Bayesian models of risk factor of Malaysian coronary artery disease male patients

ABSTRACT

Coronary artery disease (CAD) continues to be one of the leading causes of morbidity and mortality globally. Of particular relevance for this issue is that major efforts should be focused on understanding the risk factor involved. In this study, three types of Bayesian models, each with different prior distribution were considered to identify associated risk factors in CAD among Malaysian male patients presenting with ST-Elevation Myocardial Infarction (STEMI) and to obtain a feasible model to fit the data. The results of the three models were compared to find the best model. A total of 7180 STEMI male patients from the National Cardiovascular Disease Database-Acute Coronary Syndrome (NCVD-ACS) registry year 2006-2013 were analysed. Univariate and multivariate analyses for the three models were performed using one of the Bayesian Markov Chain Monte Carlo (MCMC) simulation approach known as Gibbs sampling. Models' performances are evaluated through overall model fit. Bayesian model C which used both Beta and Dirichlet prior distributions, consisted of six significant variables namely diabetes mellitus, family history of cardiovascular disease, chronic lung disease, renal disease, Killip class and age group was considered as the best model. The same set of variables that were observed to be significant in the Bayesian model C was also found to be significant in models A and B which used single prior distribution, respectively. Model C has a better fit than models A and B as the deviance value produced was the smallest. This study showed that posterior estimation was mostly influenced by the existing prior knowledge. Though applying the non-informative prior which were both Beta and Dirichlet distribution priors, model C can minimise uncertainty in making effective clinical decisions and provides better parameters estimates of the posterior distribution.