



Generalized Bernoulli Model for Correlated Binary Responses with an Application to Child Nutrition Data in Bangladesh

Mohammad Junayed Bhuyan*

Institute of Statistical Research and Training, University of Dhaka, Dhaka, Bangladesh, jbhuyan@isrt.ac.bd

M. Shafiqur Rahman

Institute of Statistical Research and Training, University of Dhaka, Dhaka, Bangladesh, shafiq@isrt.ac.bd

M. Ataharul Islam

Department of Applied Statistics, East West University, Dhaka, Bangladesh, mataharul@yahoo.com

In longitudinal studies, response from the same subjects are usually correlated and hence standard statistical models based on independence assumption may draw misleading inference. To analyze such data one needs special statistical models allowing for such dependence. Most of the studies has made attempts to address this problem using either marginal models or conditional models. However, using the marginal models or conditional models alone, it is difficult to specify the measures of dependence in outcomes precisely. Islam et al (2013) proposed a joint modeling approach for bivariate binary response using both the conditional and marginal models where the dependence in outcome variables can be measured and tested using a link function of the models. The authors investigated, via simulation studies, only the dependence of the outcome variables. However no investigation on the performance of the regression coefficient and the models as a whole was performed. In this paper, the properties of the estimates of regression coefficients, such as bias and coverage probability, of the joint model are investigated by using an extensive simulation study. The results showed that the models performed well in all simulation scenarios. An application of the model is provided using child nutrition data from Bangladesh demographic and health survey.

Keywords: marginal model; conditional model; joint model; link function.