

6th International Conference on

BIOSTATISTICS AND BIOINFORMATICS

November 13-14, 2017 | Atlanta, USA

Bayesian generalized linear mixed modeling of breast cancer in Nigeria

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Breast cancer treatment strategies in Nigeria need urgent strengthening to reduce the growth of the disease. Two main classes of approach have been developed for modeling modality of breast cancer treatment in the setting of generalized linear mixed models: classical statistics approach and Bayesian approach. This study compares the Bayesian approach with the exact conditional inference procedures for selection of predictor variables that are associated with modality of treatment given to breast cancer patients. In this paper, we introduce a Bayesian multilevel model that combines the random and fixed effect models. We investigate its performance as well as that of exact conditional inference approach in the setting of generalized linear mixed models with binary outcomes. We apply the techniques to breast cancer datasets and conduct Markov Chain Monte Carlo (MCMC) simulations. Simulation results indicate that Bayesian approach helps in selecting the more significant factors associated with modality of breast cancer treatment in Western Nigeria, as compared to the classical statistics approach. The result of Bayesian with non-informative prior is very similar to that of classical statistics and it can be superior for data with very small random effects.

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