

2047 Bayesian Approach in Analyzing Clustered Interval-censored Data

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Objective: To illustrate the Bayesian approach to multi-level modeling of clustered interval-censored data. Methods: Data from a prospective controlled clinical trial investigating the effectiveness of silver diamine fluoride and sodium fluoride varnish in arresting active dentine caries in Chinese preschool children were used. The time to arrest dentine caries on a surface was used as outcome measure of the effectiveness. A Weibull regression model was assumed with two additive random effects to account for the dependence among the arrest times on different surfaces. Two covariates were also included in the model. Analysis was performed using WinBUGS. Posterior distributions of the parameter estimates were computed based on 10000 simulations using MCMC algorithms. Results: 1483 surfaces from 367 children were included in the analysis. A significant clustering effect among the arrest times of the caries lesions on different surfaces from the same child was observed with an estimated correlation coefficient of 0.590. Annual application of silver diamine fluoride on caries lesions was found to have significantly shortened the arrest time (95% credible interval not including 0). Caries removal before the application was found to have shortened the arrest time further. As an illustration, the median time for a caries active surface of a girl living in rural area to become arrested when silver diamine fluoride was applied with and without caries removal were 7.0 and 12.5 months respectively. The median arrest times when sodium fluoride was applied with and without caries removal were 14.5 and 21.0 months respectively. The median arrest time when water was applied (the controls) was 30 months. Conclusion: Bayesian approach in analyzing clustered interval-censored data can easily be applied with the use of the software WinBUGS. It is recommended that this approach should be used to analyze complex dental data like clustered interval-censored data.

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