An analysis of length of hospital stay for diabetes patients in Japan by the Box-Cox transformation model

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Abstract: The Box-Cox (1964) transformation model (BC model) is widely used to examine a variety of problems. The likelihood function under the normality assumption is misspecified, and the maximum likelihood estimator (BC MLE) cannot in general be consistent. However, under the "small σ assumption" described in Bickel and Doksum (1981), the BC MLE can be consistent. In other words, it is absolutely necessary to test whether or not this assumption is satisfied when the BC model is used. In this paper, we test whether or not the BC MLE can be used based on the estimator proposed by Nawata (2013). We then analyze length of hospital stay for type 2 diabetes patients hospitalized to participate in educational programs about managing diabetes at home. A dataset of 970 patients collected from 27 general hospitals in Japan was used.

Keywords: Box-Cox transformation model, power transformation model, diabetes, length of stay (LOS)

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