Multiple comparisons with two controls for ordered categorical responses

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Abstract

In clinical studies, it is popular that the responses are ordered categorical. To compare efficacy of several treatments with a control with ordinal responses, the normal latent variable model has recently been proposed. This approach conceptualizes the responses as manifestations of an underlying continuous normal variable. In this paper, we extend this idea to develop the multiple comparison method when there are two controls in the clinical trial. The proposed method is constructed such that the familywise type I error rate is being controlled at a pre-specified level. In addition, for a given level of test power, the procedure to evaluate the required sample size is provided. The proposed testing procedure is also illustrated by an example from a clinical study.

Key Words: Ordinal responses; Multiple Comparisons; Multiple Controls; Familywise error rate; Latent normal model.