Cheng, Kuang-Fu (National Central University, Taiwan, R.O.C.)

Analysis of Case-Only Studies Allowing for Genotyping Error

Abstract: To assess possible interactions between genetic and environmental factors a frequently used design is the case-only design. A drawback of such case-only study is that it is impossible to detect genotyping errors and no method has been developed to allow for the presence of undetected genotyping errors. A simulation study given in this paper shows that ignoring the presence of genotyping errors may seriously increase the bias of the point estimate and reduce the power of the likelihood ratio test. The main focus of this paper is to propose methods for analysis of case-only studies when there are genotyping errors. We propose a novel conditional likelihood approach to make inference about gene- environment interactions under very general error model. We suggest that the error rates of mistyping are estimated from an internal validation study, such as genotyping some diseased individuals from the case sample twice. We also relax the required independence condition between genetic and environmental factors in case-only studies to the more general conditional independence condition. This makes case-only designs to be more useful in studying the gene-environment interactions.