Logrank-type nonparametric test for comparing survival functions with doubly interval-censored data

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Doubly interval-censored data occur in the studies of disease progression in which the onset of disease is preceded by certain virus infection. A typical example arises in the analysis of follow-up studies of patients who have been or at risk of being infected by the human immunodeficiency virus(HIV) and thus are also at risk of developing the acquired immune deficiency syndrome(AIDS). The survival time of interest is the AIDS incubation time defined as the time between the infection of HIV and the onset of AIDS. Due to the nature of periodic screening, both the HIV infection time and AIDS onset time are often interval-censored. Our purpose is to develop a logrank-type test for comparing several survival functions from doubly interval-censored data. Since we introduce uniform weights that depend on the size of the risk set at each observed time instead of the weights involving estimated marginal survivals for the HIV infection time and AIDS incubation time, the proposed test is computationally simple with continuous survival time data as well as discrete survival time data. The test corresponds to a generalization of test procedure proposed by Kim et al.[2] in which they deals with the interval-censored data. For the estimated asymptotic variance of the test statistic, we adopt the multiple imputation method proposed by Sun[3]. Results from simulation studies show that our test satisfies very well a nominal significance level and is also more powerful than the Sun[3]'s test. Finally we illustrates the proposed test procedure with AIDS latency time data from DeGruttola and Lagakos[1] and KMIC(Korea Medical Insurance Corporation) data from Yonsei University College of Medicine.

References

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