Bayesian estimation of distributions of causes of death with verbal autopsy surveys

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Abstract

A population distribution of causes of death provides crucial information for dealing with public health issues. However, in many developing countries with limited medical certification and registration of deaths, there is big uncertainty in vital statistics on causes of death in the populations. As a practical way of obtaining population representative data of deaths by cause, verbal autopsy surveys collect information by interviewing family members about the signs, symptoms and medical history of the deceased. This article develops a new Bayesian method for estimation of population distributions of causes of death, taking into account characteristics in verbal autopsy data. The proposed approach is based on a multivariate probit model where associations among items in questionnaires are flexibly induced by latent factors. We measure strength of conditional dependence of symptoms with causes in the proposed framework. Using the Population Health Metrics Research Consortium gold standard data, we assess performance of the proposed method and estimate important questionnaire items highly associated with causes of death.

Key words: Bayesian latent model; Causes of death; Conditional dependence; Multivariate data; Verbal autopsies; Survey data.