Validity of data-derived algorithms for ascertaining causes of adult death in two African sites using verbal autopsy

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Summary

Background
Verbal autopsy (VA) is used to ascertain causes of death using information obtained from bereaved relatives. This technique has been used widely in surveys and demographic surveillance systems in developing countries. Causes of death can be ascertained from VA questionnaires by a panel of physicians or from pre-defined algorithms. In a previous study, we developed data-derived algorithms using VA data from 796 adult deaths that occurred in hospitals in Tanzania, Ethiopia, and Ghana (primary sites). These computerised algorithms accurately estimated the cause-specific mortality fractions (CSMFs) for deaths due to injuries, meningitis, TB/AIDS, and diarrhoeal diseases in the primary sites. Since the same data were used to generate and to validate the algorithms, the accuracy of our algorithms may have been overestimated. We report here on the validity of the algorithms when they were applied to VA data from two secondary sites in Ghana and Tanzania. Here, ‘validity’ is taken to mean the degree to which the algorithms replicated the physician-generated CSMF for major causes of death, when applied to the same VA data.

Methods
VA interviews were performed in two secondary sites. In Navrongo, Ghana, VA interviews were performed on 406 adult deaths, and three local physicians independently reviewed the questionnaires and assigned a cause of death. In Morogoro, Tanzania, VA interviews were performed on 209 adult deaths. A panel of physicians independently reviewed the VA questionnaires together with the hospital death certificates or hospital records to determine the cause of death. The CSMF obtained using each algorithm was compared with the CSMF obtained using physician review.
Results
For injuries and meningitis, the algorithms and physician review estimated a similar CSMF in the Morogoro and Navrongo data. For TB/AIDS, the algorithm estimated a similar CSMF as the physicians in Morogoro. The algorithm for diarrhoeal diseases did not agree closely with the physicians in Morogoro or Navrongo.

Conclusions
In general, our data-derived algorithms for assigning causes of death due to injuries, meningitis, and TB/AIDS estimated a similar CSMF as the physicians in the secondary sites. Recommendations for further validation and refinement are discussed. Computerised algorithms offer a potentially quick, affordable, and feasible method for assigning causes of death in mortality surveillance or studies using VA.