Multiple causes of death analysis of chronic diseases: the example of diabetes

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BACKGROUND: Identifying a single disease as the underlying cause of death (UCOD) is an oversimplification of the clinical-pathological process leading to death. The multiple causes of death (MCOD) approach examines any mention of a disease in death certificates. Taking diabetes as an example, the study investigates: patterns of death certification, differences in mortality figures based on the UCOD and on MCOD, factors associated to the mention of diabetes in death certificates, and potential of MCOD in the analysis of the association between chronic diseases.

METHODS: The whole mortality archive of the Veneto Region-Italy was extracted from 2008 to 2010. Mortality rates and proportional mortality were computed for diabetes as the UCOD and as MCOD. The position of the death certificate where diabetes was mentioned was analyzed. Conditional logistic regression was applied with chronic liver diseases (CLD) as the outcome and diabetes as the exposure variable. A subset of 19,605 death certificates of known diabetic patients (identified from the archive of exemptions from medical charges) was analyzed, with mention of diabetes as the outcome and characteristics of subjects as well as other diseases reported in the certificate as predictors.

RESULTS: In the whole mortality archive, diabetes was mentioned in 12.3 % of death certificates, and selected as the UCOD in 2.9 %. The death rate for diabetes as the UCOD was $26.8 \times 10(5)$ against $112.6 \times 10(5)$ for MCOD; the UCOD/MCOD ratio was higher in males. The major inconsistencies of certification were entering multiple diseases per line and reporting diabetes as a consequence of circulatory diseases. At logistic regression the mention of diabetes was associated with the mention of CLD (mainly non-alcohol non-viral CLD). In the subset of known diabetic subjects, diabetes was reported in 52.1 %, and selected as the UCOD in 13.4 %. The probability of reporting diabetes was higher with coexisting circulatory diseases and renal failure and with long duration of diabetes, whereas it was lower in the presence of a neoplasm.

CONCLUSIONS: The use of MCOD makes the analysis of mortality data more complex, but conveys more information than usual UCOD analyses.