Reviewer's report

Title: 16-year excess all-cause mortality of newly diagnosed type 2 diabetic patients: a cohort study

Version: 1 Date: 5 August 2009

Reviewer: Giel Nijpels

Reviewer's report:

The objective of this study is to investigate the age- and sex-specific all-cause mortality pattern in patients with type 2 diabetes in comparison with the Danish background population.

In the study two different populations were used: a population-based cohort study of 1323 patients diagnosed with clinical type 2 diabetes in 1989-92 and followed for 16 years and the Danish register data from the general population. The age- and sex-specific hazard rates were estimated for the cohort using the life table method and compared with the expected hazard rates calculated with the Danish register data.

The investigators found out that in comparison with the general population, diabetic patients had a 1.5-2.5 fold higher risk of dying depending on age and that the over-mortality was higher for men than for women.

It is an interesting study and the results emphasis the high mortality risk found in several other studies.

However, there are some comments. The major comments concern the methodology.

1. The study population was obtained from an intervention study started in 1989. It is unclear why some GP's were allowed to extend the inclusion period with one year, how well were the GP's able to include all the new diabetes patients? It is also unclear why 162 patients were excluded from this analysis, because these patients would certainly increase the mortality rate in the diabetes population and therefore, to my opinion, this methods introduces bias. Of course we do understand that this was necessary for the intervention study but it must have influenced the final numbers.

2. The way the vital status was coded in this population is too limited. Was it always very clear if someone died, even if people removed to other areas? How well is the Civil Registration System in Denmark? This is vital to understand the reliability of the mortality rate.

3. The statistical analysis: as far as we understand the data from the national register in Denmark from 2001-2005 were used more or less as a cross-sectional dataset. Then every age-group was analysed for the mortality rate and showed in a longitudinal way. This method has several limitations. The first and most important one is that a time-trend in mortality can not be analysed. Much have
changed over the years from 1989 on. So, mortality rates in 2001-2005 can differ much from the start of the first cohort. For the intervention population two other problems are not clear. Patient become older and as a results they move to the next age-groups. However, it is unclear how this was analysed. If someone went to another age-group then the survival probability start with 100 %, so the age-group 60-79 exists from participants 60-79 years of age at the start if the intervention and those who became 60 during the study. This is very confusing. In other words, the age-group 60-79 exists of a mix of subjects getting diabetes at that age and subjects who already had diabetes at a younger age. This will decrease the mortality rate substantially. It is no wonder that for that reason in the oldest age-group the mortality rate does not differ any more between diabetes subjects and the total population.

Minor comments are:

1. Results section: The explanations of figure 2 and 3 are very brief. Please explain the figures better, both in the text of the results section and in the figures itself.

2. Discussion section: the many limitations of the study must be better discussed. Apart from the fact that diabetes patients are encompassed in the Danish register, also the time-trend, the overlap, the problem that subjects move from one to another age-group, the exclusion criteria from the intervention study, are main limitations.

3. The conclusion about the highest age category must be changed because of the study limitations.

4. In the introduction few recent papers are cited. Until 2009, several papers described the mortality risk in different populations like the Finnish Prevention Study, the Hoorn Study, the Bruneck study. I would advise the authors to update the references.

5. At the end of the abstract and the discussion is concluded that this study highlights the importance of improving care but this conclusion is not based on the results of this study.

6. ‘Woman’ in the last paragraph of the discussion should be ‘women’

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests