Reviewer’s report

Title: Impact of behavioural risk factors on death within 10 years for women and men in their 70s: absolute risk charts

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Reviewer: Damien Jolley

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This is an excellent manuscript which sets out to develop absolute mortality risk charts for Australians in their 70s, modelled on the CVD absolute risk charts developed in New Zealand over the past few years. Rather than focus on a specific cause of death, however, these authors look at all-cause mortality absolute risk, by behavioural risk factor patterns among persons aged between 70 and 79 years.

Based on two well-conducted population cohort studies for the two genders, logistic relative mortality risk models separately for <7,000 women and >6,000 men. Ten-year mortality from any cause was the binary outcome in logistic regression models.

The authors note that:

The odds ratios for death within 10 years were similar for women and men for all the variables, but the probability of death was higher for men as indicated by the constant terms in the models.

This is a fascinating observation, particularly that the risk factors for 10-year mortality are so similar.

The authors appear to have overlooked the opportunity (in Table 2, at least) to convert the logistic regression constant coefficients into absolute risks among baseline risk-factor cohort members of the two genders. The simple method recommended by Zhou and Donner (1) is an excellent way to compute the difference in log-odds for both cohorts (-1.76 – (-1.07) = -0.69) between women and men free of risk factors. Given the two cohort-specific 95% confidence intervals for these constant terms, a 95% CI for the difference measure between sexes for the logistic constant can be calculated as (-1.24 to -0.9).

But, just as Table 2 and later figures show, these log-odds estimates can be converted directly to absolute risk, as can the constant term.

Cohort Logistic constant Absolute
Risk Lo 95% CI for const Lo 95% CI for risk Hi 95% CI for const Hi 95% CI for risk
Women -1.76 14.6% -1.98 12.3% -1.53 17.8%
Men -1.07 25.5% -1.24 22.4% -0.9 28.9%
Difference -0.69 33.4% -0.968 27.5% -0.404 40.0%
There is also an attachment which shows the logic of Zhou & Donner’s MOVER method for computing confidence intervals for a difference in independent estimates.

I suggest that the difference of 33% in 20-year absolute risk between women & men will have greater meaning to BMC readers (and the MOVER 95% CI confirms the "significant" difference which exists between women & men within every risk factor subcohort.

Another remarkable observation, evident from both Table 2 and following figures, is that overweight septagenarians have less absolute mortality risk than those of either normal BMI or obese BMI categories. This U-shaped trend in risk is rarely found (in my limited experience) for an exposure as BMI, generally considered a well-behaved risk relationship.

Perhaps the authors may want to draw their readers' attention to this oddity and suggest PH behaviours which could explain (eg that overweight Australians die at an age earlier than 70, and therefore have more internal robustness than cohort members with BMI < 25 kg/m2. This hypothesis has no support in the literature of which I am aware, but perhaps the authors have already investigated this interesting observation.

**Level of interest:** An exceptional article

**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.