Reviewer’s report

Title: Postponement of adverse outcomes is a sensitive measure of risk reduction for chronic disease prevention - a randomized study of risk communication among lay people

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Reviewer: Elizabeth Murray

Reviewer’s report:

General
Summary.
This paper reports an interview study conducted amongst a reasonably representative population sample in Denmark. The data reported here are the association between different levels of acceptance of a hypothetical medication with the postponement of a heart attack. The authors found a correlation, with a higher level of acceptance associated with a greater duration of postponement, and conclude from this that their method of presenting risk is understandable by the lay population interviewed.

Is the question posed by the authors new and well defined?
This paper intends to add to the literature on presentation of risk, and an exploration of improved methods of doing this. This is an important area, and one of relevance to this BMC journal. I was not previously aware of work on presentation of risk as a postponement of an adverse event, and, on initial consideration, this seems a potentially plausible way forward. However, as I considered it further, I became more and more sceptical of the validity of suggesting that reducing the population risk of an adverse event happening is equivalent to postponing the event in an individual. I think there are several problems with this approach:

a) The well known problem of applying a population risk to an individual. Take for example an adverse outcome that has a population risk of 15%. Firstly we know well that this does not mean that every individual in that population has an equal (15%) risk of this event – some people within that population are more likely to experience it than others. The greater the similarity between the individual in question and the population studied, the greater the similarity in risk – but we know that we do not know all the important characteristics within an individual that determine risk.

b) This problem is even greater when we talk about risk reduction. To continue this hypothetical example, if the background risk is 15%, and a preventive measure can reduce the population risk to 10%, it is inaccurate to tell an individual that the same measure reduces their particular risk from 15 to 10%. Firstly there was uncertainty about their original risk, and secondly there is uncertainty about the effectiveness of the preventive measure in their individual case.

c) With all this, there is the problem that although we talk about 15% of a population experiencing an adverse event, for the individual, they either experience it or do not experience it. There is no such thing as 15% of a heart attack – you either have one, or you do not have one. And although we know many of the factors that affect the risk of having a heart attack (age, gender, family history, smoking, diet, exercise, lipids, etc), we do not know them all – and therefore we can never provide a totally accurate risk estimate.

So if this is the complex reality of trying to describe risk to patients, how does this measure of postponing an adverse event compare?

a) The first problem, as the authors acknowledge, is that describing risk reduction as a postponement of an adverse event implies that everyone will have the adverse event. This is simply not true.

b) The second is that time is relative. If the background level of risk is that you have a 50% chance of dying within one month from a heart attack, a month’s postponement would seem quite good value. However, if you’re not expecting your heart attack to strike within the next 5 years, a month may seem neither here nor there. We see this change in valuation of time gained in people with cancer, who often opt for treatments that will postpone death by a few months.

c) Thirdly, I have real anxieties about the accuracy of the data on postponement. The range of times chosen for this study (1 month to 8 years) is very large compared to the real effects of most treatments, which in population terms, often extend life by months rather than years. I think if this was going to be a useful method of presenting risk reduction to patients, it would have to be based on “real” estimates of time gained. These are very hard to calculate, with all the uncertainties described above.
Having described my fundamental reservations about the underlying validity of this study, I now go on to consider the way the study was undertaken and reported.

Are the methods appropriate and well described, and are sufficient details provided to replicate the work? The authors describe a population-based survey, with a face-to-face interview of 1,367 Danes aged over 40 years. I would be surprised if such a labour intensive methodology was used purely for this question, and it would be useful for the authors to present the primary purpose of the survey – presumably this paper is reporting on a small sub-sample of the total data. The main survey question reported in this paper is adequately described, with sufficient detail to replicate the work. It would be helpful to present the questions and classification for the demographic data too – was a standardised instrument / were standardised questions used? Have these questions or instrument been published in full elsewhere? If so, a reference would suffice, but if not, the authors could present these questions as an appendix.

Are the data sound and well controlled? The main data are the % respondents accepting a hypothetical treatment, correlated with the time this treatment is said to postpone an adverse event (a heart attack). The function of Table 1 should be to let the reader decide on the representativeness of the population sampled overall, and whether there was any unintended bias in the distribution of people receiving a specific time of postponement. The first task would be aided by providing a final column of the overall figures for the total Danish population (or total sample originally approached).

Table 2 gives the proportion of respondents who consented to the hypothetical therapy. I think it would be helpful to provide a visual representation of these data, showing the relationship between postponement of event and proportion accepting the treatment. The other main finding in Table 2 is that the proportion of respondents who found the information difficult to understand did not vary across the time of postponement. I think this should be reported in the text.

Table 3 provides a multivariate logistic regression for the odds of consenting to therapy. Looking at the numbers in each cell in Table 1 (which are often quite small), I am surprised that it was possible to do this logistic regression. Please could a statistician check this.

Discussion and Conclusions. The main result is that the longer the postponement of the adverse event, the greater the proportion of respondents who stated they would accept the treatment. From this finding, the authors conclude that participants in their study could understand this way of presenting risk reduction. I do not think this conclusion follows – the only conclusion that follows is that people are more prepared to take a medication which postpones an adverse event for years rather than months – this does not necessarily translate into an accurate understanding of risk.

Style of writing. The paper is adequately written, and does not need much editing.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
1. Change the title of the paper to reflect the uncertainty within this work. A more accurate title would be something like: Can postponement of an adverse outcome be used to present risk reduction to a lay audience? A population survey. By posing a question in the title, the authors will be encouraged to be more reflective and questioning in their introduction and discussion, better reflecting their data.
2. Rewrite the Introduction to include more detail about the Christiansen work on osteoporosis, and presentation of NNT compared to postponement of hip fracture. Also present the NNT for a lipid lowering drug, and how this would convert to years postponement of MI, so that the reader can see the relevance (or otherwise) of the time frames presented.
3. Include a more thoughtful discussion of the validity of postponement of an adverse event as a presentation of risk, including the pros and cons of this approach (in the Introduction).
4. In the methods, clarify whether this study was the main purpose of the survey, or whether there was an alternative primary purpose. Also provide either an appendix on the data collection instrument for the demographic data, or a reference to an article which describes it in full.
5. Results – include a column in Table 1 to allow the reader to determine the representativeness of
participants compared to the Danish population aged over 40 (or to total sample).
6. Present the relationship of proportion of respondents accepting treatment to duration of postponement graphically – to help the reader see the shape of the relationship.
7. The discussion and conclusions should be rewritten more cautiously, and more critically.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
P7, last line. “Consent was present if the subject answered yes to treatment and not present if the subject rejected the treatment or meant too little information was given”. Suggest reword underlined phrase to “if the subject rejected the treatment or was uncertain”.

Discretionary Revisions (which the author can choose to ignore)