Author's response to reviews

Title: Awareness of risk factors for cancer: A comparative study of Sweden and Denmark

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Author's response to reviews: see over
Response to reviewers’ comments

Reviewer 1: Terry Slevin

Methods
1. The choice to include the “Don’t know” response into the “lack of awareness” category may be a problem. Without knowing the precise framing of the question it is a little difficult to offer clear judgement. However, for example, in the category of alcohol, some people may believe alcohol increases cancer risk. Some may believe some forms of alcohol (eg red wine) reduced cancer risk. To aggregate “don’t know” responses into an “unaware” category may lose some of the nuance of the data. The authors might consider reporting the data with “don’t know” separately reported.

The reason we included ‘don’t know’ into the group of people with less awareness was because they did not know. The option to report ‘don’t know’ separately would still not take care of the example with alcohol above. We’d still not know what types of alcohol they would believe are risk factors for cancer or not or for what types of cancer. The argument is that if you do not know that e.g. sunburn gives you an increased risk of melanoma then you do not know and hence lack awareness. Furthermore, the proportion of respondents answering ‘don’t know’ is below 4% for all risk factors except meat (6.4%) and HPV where 62% responded they didn’t know what HPV is and 1.6% answered ‘don’t know’.

The following sentence has been added to the methods section line 154-158: ‘Don’t know’ was included in the category ‘lack of awareness’ because these respondents were not aware that the factor in question was a risk factor for cancer, hence lacked awareness. The proportion of respondents answering ‘don’t know’ was below 4% for all risk factors except red/processed meat (6.4%) and HPV-infection where 62% responded they didn’t know what HPV is and 1.6% answered ‘don’t know’.

We have also inserted the precise phrasing of the question in this paragraph, line 148-152: Using a recognition method, the respondents were presented with each of the above risk factors after the following instruction: ‘I am now going to read out a list of things which may or may not increase your chances of getting cancer. For each one can you tell me how much you agree or disagree that it may increase your chances of getting cancer?’

Discussion and conclusion
2. There appears a heavy emphasis on finding and interpreting differences between Sweden and Denmark in the cancer risk perception data - and seeking explanations in cultural or other differences between the nations. As an outsider any such differences may result from different emphases placed on the communications of such risk factors by reputable authorities such as Government Health Authorities or cancer societies. Another suggestion is to pool the data and report an “all sample” finding on risk perception. The paper acknowledges example of this effect when referring to the anti sun bed and fruit and veg campaigns run in Denmark.
We agree that differences in awareness between Sweden and Denmark may well be a result of how these risk factors have been communicated by health authorities and media. However, how they are communicated and perceived may also be a result of subtle underlying cultural differences. Unfortunately the data at hand only allows us to speculate, as we indicate in the discussion: ‘However, it is important to point out that the cross-sectional design of the current study does not permit drawing conclusions about the impact of health campaigns or changes in awareness over time.’

We have not chosen to pool the data, since the purpose of this study was to study differences between the two Nordic countries, which have many similarities in culture, healthcare systems, and economic status, but which nonetheless show differences in cancer incidence and mortality.

3. I would caution against the final sentence in the conclusion. To state that “the higher awareness of risk factors in Sweden compared to Denmark may be a contributing factor in the disparities in cancer incidence and prognosis between the two countries” assumes many links between “awareness levels” and outcomes such and incidence and stage of prognosis. This allows the final statement of the paper to be open to significant challenge.

This statement has been removed from the conclusions. In line with this we have also removed the following sentences from the last paragraph of the introduction: ‘Although the overarching aim of the ICBP is to study international variations in cancer survival, in this study we do not aim to examine the link between awareness and cancer survival. Since this study was designed to reflect the current awareness in the general population the results can inform policy decisions that may affect future events (e.g. cancer survival).’

4. Some relevant studies the authors may be interested in but are not cited include


Thank you for these suggestions! We have now included a reference to MacTiernan et al. in the introduction among the studies which don’t find an effect of age on awareness of established risk factors for cancers, line 99: ‘An association between age and awareness of established risk factors for cancers has been indicated in some studies [9, 10, 15, 17, 18]; however no consistent age-related pattern emerges across different cancers and risk factors, and other studies find no effect of age [11, 19-21].’
Abstract

Major Compulsory Revisions

1. This should be clear to the reader that the findings from the study support findings from other European countries as there were generally low public awareness for risk factors of cancer. – This could be outlined in the conclusion.

   We have added the following sentence to the conclusions in the abstract as well as to the Conclusions and implications on line 322-323: ‘This study supports findings from other European studies that generally demonstrate modest public awareness of many established cancer risk factors.’

2. In line 49-50. Although the author used the sentence “may contribute to disparities in cancer incidence and prognosis”, the other factors that contribute to poor cancer prognosis is the delay in diagnosis. Several factors contribute to the delay in diagnosis includes unawareness of public / patients of early signs or symptoms of cancer, GP’s failed to diagnose or refer cancer patients at an early stages of the disease and also, there might be a delay in starting treatment in secondary care.

   We agree with this comment, which the other reviewer also reacted to. We have removed this sentence for increased stringency in truth claims. This explorative, ecological study was not designed to test whether cancer awareness in the two countries is associated with cancer incidence and survival, so we will appropriately refrain from drawing such conclusions. On the same basis we have also removed the following sentences from the last paragraph of the introduction: ‘Although the overarching aim of the ICBP is to study international variations in cancer survival, in this study we do not aim to examine the link between awareness and cancer survival. Since this study was designed to reflect the current awareness in the general population the results can inform policy decisions that may affect future events (e.g. cancer survival).’

Minor Essential Revisions

3. Could confidence intervals (CIs) for the significant findings be included?

   We would prefer to preserve the general nature of the results section in the Abstract and to not include specific point estimates with 95% confidence intervals here, since all these can be found in tables 3 and 4 in the manuscript.

4. Line 50-51. “Efforts should be made to improve awareness”. How that can be implemented? Please give examples. What are the most effective tools that are applicable to do this in Sweden and Denmark?

   We have added a section to the Conclusions and implications regarding this on line 332-336: ‘One way to increase awareness, which has shown some success, could be to deliver tailored multiple risk factor health and lifestyle advice in conjunction with existing screening programs [36]. Previous studies indicate that repeated, broad campaigns, as well as a multimedia approach, including e.g. television and the
Internet, to reach different socioeconomic subgroups, are needed to attain changes in attitudes and behaviours [37-39].

**Background**

**Minor Essential Revisions**

5. Line 72-75. Yes, it is knowing, but can the author put the reference/references?

This paragraph has been revised and now reads: ‘It is widely accepted that awareness is an important condition, although not sufficient on its own, for creating behavioural change. For some cancers, risk can be reduced through behavioural changes of modifiable cancer risk factors. Further, in the case of both modifiable and non-modifiable factors awareness might promote appropriate health-seeking behaviour. By addressing known modifiable risk factors it has been estimated that a third to half of all cancers in the developed world could be prevented, and that early diagnoses and effective treatments could cure another one third [6-8]. Assessing awareness of risk factors for cancer among the general public is thus an important step in identifying potential areas where awareness may need to be raised.’

6. Line 80-81 ‘one previous study finding that adults in Denmark had lower awareness of colorectal cancer risk factors than adults in Sweden’. Any reasons were found in the study that attributed to such differences?

The paper doesn’t offer any explanation for this difference, and we have added this information to the paragraph on line 88.

**Material and methods**

**Major Compulsory Revisions:**

7. Population samples were selected at random. How was the sample selected? What type of randomization was used?

Simple random sampling was conducted within the respective age interval (30-49 and ≥50).

We have reworded the text in the first paragraph of the Methods section: ‘Using simple random sampling a total of 20,000 residents 30-49 years of age and 40,000 residents aged 50 and older were selected from the Danish Civil Registration System (CRS). In Sweden, a total of 8000 residents 30-49 years of age and 15,000 residents aged 50 and over were selected from the Swedish Population and Address Register (SPAR) for the Uppsala-Örebro and Stockholm-Gotland healthcare regions in Sweden.’

**Minor Essential Revisions**

8. Line 110. Would you please brief more, what “Module 2 survey through the ICBP” means for the international readers?

This sentence has been reworded to the following ‘We used data collected through a telephone survey for the ICBP Module 2.’ Module 2 is introduced in the
first paragraph of the Background section: ‘In the second of five ICBP-modules, cancer awareness and beliefs in the general population were investigated’, and is described more in depth in the section ‘Survey measure and study variables’.

9. Line 119-120. I think the author means see the detail in studies references 18 & 19.

The text within brackets on line 123-124 has been changed to ‘(for further details about the methodological procedures, see references [22, 23])

10. Any reliability test has been conducted? What was the results of Cronbach's alpha in the pilot study, if it has been conducted indeed?

The development and testing of the ABC instrument used in Module 2 has been described in detail in the methodological paper by Simon et al (2012). We refer the reader to this paper in the Methods section in order to find more details regarding methodology, line 135-136: ‘(for further information on instrument development and testing, please see references [22, 23])’. The internal consistency for the risk factor scores was good (Cronbach’s $\alpha >0.70$), test-retest reliability was $\geq 60\%$, and ICC was good ($r=0.67$ for total risk factor score).

11. Why “don’t know” added to “disagrees” and “strongly disagree”?

Please see response to comment 1 of reviewer 1.

Results
12. Line 172-174. In Sweden, the average age of respondents was slightly higher and had high education than in Denmark. Does this contribute to the factors for the differences?

In an effort to account for these differences between the Danish and Swedish samples we adjusted for both age and education in the multivariable analysis. Thus we don’t think that these factors can explain the differences in awareness found between countries. We mention the fact that we adjust for the known sociodemographic differences both in the section on Statistical analysis and in the discussion.

Aiming to make this clearer we have revised the paragraph starting at the bottom of page10 and inserted the following sentence on line 270-272: ‘To diminish the potential confounding effect that such selection mechanisms may have on the outcome we adjusted for education, age and other sociodemographic factors that we had data for in the multivariate analysis.’

Discussion

Major Compulsory Revisions
13. The questionnaire introduced through telephone interviews and not as “self-administrative” Any bias is expected while using such method?

Social desirability bias is a concern for questions regarding behaviours, especially socially undesirable behaviors. A tendency towards reporting more
positive health behaviors among telephone respondents compared to questionnaire respondents was observed in a Danish study by Feveile (2007). The questions used for this specific study were not particularly sensitive and thus we have no cause to suspect social desirability bias. Furthermore, the same questions and data collection methods were used among the Swedish and Danish respondents. The prompted format resulting in higher awareness and possible selection bias are likely greater concerns, as pointed out among the limitations.

We have added a paragraph about social desirability bias in the discussion on page 11, line 274-279: ‘The questions used for this study were not particularly sensitive but we still acknowledge that there may have been a tendency among respondents to give socially desirable answers, which could have led to an underestimation of the lack of awareness. However, since the same questions and data collection methods were used in Sweden and Denmark there is little reason to believe that this type of information bias would have affected comparisons between countries.’

14. Did people who conducted telephone interviews had any training to avoid any misleading while asking the questions? If not, then this should be one of the study’s limitation.

We have changed the information in the first paragraph of ‘Study population and data collection’, line 121-124 and it now specifies that the interviewers were trained: ‘Computer-assisted telephone interviews were carried out by trained native-speaking interviewers from the research company Ipsos MORI’. Thus we don’t believe that lack of training should have introduced any further bias.

Conclusions

Minor Essential Revisions

15. Again, how public awareness for cancer risk factors can be improved? Please explain strategies that are relevant to both countries. Give examples of their effectiveness using evidences.

Please see our response to comment number 4.

16. Can the same methods be applicable to the third World/ developing countries?

We are uncertain what methods the reviewer is referring to, but we assume that it refers to methods that could be used to improve public awareness of cancer risk factors.

It’s outside the scope of this study to answer this question. First of all, each country would have to identify and prioritize the most important health risks to address and would then have to consider what methods are available and most efficient to communicate information and increase awareness.