Reviewer's report

Title: Predictors of working beyond retirement in older workers with and without a chronic disease - Results from data linkage of Dutch questionnaire and registry data

Version: 0 Date: 01 Jun 2017

Reviewer: Mieke W. Koehoorn

Reviewer's report:

Overall, this paper addresses an extremely important area of research on the predictors of working past retirement, employs a very rich set of data to investigates predictors, and utilized data linkage for objective socioeconomic measures. The following recommended revisions are intended to strengthen the paper for publication purposes, to help with the communication and interpretation of the findings, and to help the reader understand the implications of the findings for policy and practice.

Background Section:

This study is important, but the background section would be strengthened by a more cohesive summary of the existing evidence leading to the study rationale focused on chronic disease. For example, the second paragraph of the Background provides a good listing of key findings from previous studies, but it does not synthesize this evidence base or 'funnel' the information for the reader to help understand the study rationale. Instead, the focus of this section leaves the impression that there is a research need to investigate socioeconomic factors in predicting retirement. Further, this paragraph states that work, health and social factors are predictors of retirement decisions but does not elaborate, nor offer information on how these findings informed the current study rationale and/or methods. The reviewer agrees with the authors in the third paragraph that the aging workforce has a higher prevalence of chronic disease that might impact retirement decisions, but the concluding sentences on reduced possibilities to leave work for workers with chronic disease are unsubstantiated or supported by evidence. Further, the paragraph that follows on predictors of working to retirement leaves the reader with the impression the current study may focus on workplace supports and resources as predictors that differentiate retirement decision for workers with and without chronic disease, but these variables do not appear to included in the current analyses. In summary, key elements of the background are present but an edit is warranted to summarize the information and to 'funnel' the information to arrive at a cohesive rationale for the current study and primary research question.

Methods:

The strength of this study is the rich data set for the investigation of differences in predictors of retirement by chronic disease status, including multiple validated variables within the domains of demographic, socioeconomic, work, health, and social characteristics. The strength of this study
also includes linkage of questionnaire data for cohort members with national registry data for socioeconomic measures. Given the rich set of data, it is challenging to provide detailed information on every measure and the authors have done a great job of conveying the source for each variable. However, methodological decisions were made about the analytic variables that seem arbitrary and not always intuitive that detracts from the rigour of the overall study design.

For example:

1. Dependent variable of working beyond retirement: Figure 1 suggests a significant exclusion of workers who decided to continue to work during the follow-up survey years, representing a loss of almost three-quarters of the eligible sample. This may be a lack of understanding by the reviewer on pension benefits and/or retirement definitions, but presumably workers aged 56 to 64 who continue to work during the follow-up period, compared to those who fully retire with no subsequent work or those who draw some pension while continuing to do some work, are directly relevant to the research question and should be included in the analyses. This exclusion criteria needs to be clarified to fully understand the study sample, the key outcome measure and the predictive models.

2. Chronic disease status: Were study participants provided with any qualifying information to help with the interpretation of the self-reported chronic disease outcomes? For example, were these questions prefaced with an explanation that the conditions be diagnosed by a health care professional and have, or were, expected to last for more than 6 months, or something to this effect?

3. Predictive Variables. There are a number of unanswered questions for the reader about these variables. Again, the review appreciates that there is limited space to convey details for a long list of predictor variables, but some of these variables and the analytic categories are not intuitive and as a result challenging to interpret in the predictive models, as follows: a) The definition of profession (and subsequently referred to as sector) is not intuitive to the reader. These three categories would suggest the exclusion of many professions and sectors from the working cohort (e.g. administration, retail/sales, trades, to name a few). Why these three categories and what is represented in handcraft and transport professions? Are the three professions a reflection of the selection criteria for the STREAM study? The distribution of the study samples by profession is also unclear in Table 1 (does not sum to 100%); b) Why is years of physically demanding work defined by 8 years and years of mentally demanding work defined by 16.5 years?; c) Why were the physical health items for fatigue, fullness of life and being worn out dichotomized and what was the cut point on the 100-point scale?; d) Why use different (collapsed) categories of responses for some partner social items and not others?
4. Some of variables in the health domain would appear to have a degree of overlap both within the domain as well as with the key construct of chronic disease status, suggesting some of these variables may have been redundant/unnecessary or may have had an unanticipated effect in the analytic models. Did the authors expect an independent, predictive contribution for the variables of depression and pain in legs/feet in addition to the chronic disease construct that included psychological disorders and problems with legs/feet? Presumably, the lack of a predictive effect for some of the variables in the health domain is because the concepts were already captured in the stratification measure of chronic disease. This may lead to challenges with the analytic models and the ability of some variables to contribute an independent, predictive effect.

In terms of the analysis, it would be helpful to know why the researchers choose logistic regression (as opposed to multinomial logistic regression with the inclusion of individuals who continued to work as another category - see note above) and the rational for backwards stepwise selection (versus forward or just stepwise). The research question and the richness of the data and the type of variables included in the analysis (potential for overlap, intermediary variables) might have also lent itself to PATH analysis to decompose the sources of correlation between independent variables and the dependent variable and to tease out the direct and indirect effects. A rationale for the analytic decisions would be helpful to understand that the current approach was the best approach for maximizing the data and research opportunity to answer the primary question.

Results:

The tables of results are not user-friendly in their current formulation. The authors are encouraged to re-visit the presentation of findings in tabular format with an eye to enhancing the visual communication of the results. At a minimum, the authors are encouraged to think about right-justification of statistics for the ease of comparison across rows and columns for the reader, to think about a girdles table/minimal use of gridlines for delineating columns and rows, as well as consistency of presentation with regards to reference groups for variables (was not always clear what the reference group was for all predictors in the models).

A succinct Results section can be very effective in focusing the reader on key findings/messages, but the reader is left to interpret much of the descriptive findings for this paper from Table 1. The paper would benefit from a more detailed paragraph describing the characteristics of the two sub-samples and highlighting important differences for the reader, in addition to the differences in working beyond retirement age. For example, it is helpful to highlight for the reader the similarities between the two groups on measures/domains like age, education, economic distributions, mental load and years of mentally demands work; but, also the distinct differences between the two groups for variables within the health and social domain (not surprisingly…but still helpful to draw attention to this in the presentation of the Results).
For the final models, it would be helpful to have a concluding paragraph that highlights more explicitly the differences between both the domain-specific and the full models results for the sub-samples with and without chronic disease, as the main purpose of the paper. An interesting part of the results story is that the socioeconomic factors mattered as its own domain for workers with chronic disease but not for those without chronic disease, and that the effect for workers with chronic disease did not remain in models adjusted for other domains/factors. Similarly, an interesting part of the results story is that many variables in the work domain on its own mattered for those with chronic disease but less so for those without chronic disease, and several of the work variables were retained in the final model adjusted for other effects. Health as a domain on its own mattered for both sub-samples, but different things within this domain mattered for the two sub-samples that is an interesting part of the story. Finally, social factors on its own was important for both sub-samples, but this effect only remained for those without chronic disease in the final adjusted model. The authors focus on the results at the domain level, but there are lots of novel results within/between domains and between adjusted/unadjusted results that differ for the two sub-samples that warrant equal attention.

Discussion:

As part of the opening paragraph, it might be helpful to state that, despite a rich dataset with multiple predictors, there remained a lot of unexplained variability for working beyond retirement for both sub-samples with and without chronic disease in the final models. As part of the explanation of the findings, it would be very helpful to readers to elaborate on the statement/provide a more fulsome discussion that domain specific predictors of working beyond retirement differed between the two groups, as a novel and important contribution to the field of research. Further, are there any references to support some of the possible explanations provided in the discussion on the possible healthy worker effect or possible work adjustment for workers with chronic disease? It may also be possible to draw upon some descriptive statistics from the current study to help support hypothesized explanations for the findings. For example, a comparison of the health characteristics of both samples might refute or support the statement that the group without chronic diseases may have other health problems. The differential effect for the social factors between the two groups needs to be explored in more detail in the discussion, again as a novel and important contribution of the research. Finally, the current models appear to be an extension of work completed by co-author Scharn but the discussion does not link the current results to this prior work in terms of advancing current knowledge.

While it's true that the final model for the sub-sample with chronic disease did not explain as much variability in the outcome as the model for those without chronic disease, one might argue that the R-square values for both models did not explain the majority of the variability in the outcome. It might be helpful here to provide a commentary on the multifactorial nature of deciding to retire and point the reader to conceptual frameworks to guide future research on predictors of these decisions. It might also be helpful in this paragraph to link to literature in the Background section about workplace social supports and resources as possible important predictors of working beyond retirement among the population with chronic disease.
A more fulsome discussion of possible study limitations is warranted. For example, the dichotomy for the chronic disease status variable may be an issue where individuals with multimorbidity are considered the same as those with one condition (are there descriptive statistics on this - 1 vs multiple conditions to help the reader understand more who is in the chronic disease group). The self-reported nature of the chronic disease status (as well as other measures) may also be methodological issues worthy of discussion in the limitations section. The inclusion/exclusion criteria for the sample needs to be clarified (see note above in Methods) if and possibly discussed in the limitations section if the sample/outcome measure does not capture all possible types or retirement and work decisions in the population. Are the authors able to state any implications of the findings to guide policy, practice or programs to either assist individuals with chronic disease to retire, to or to help them continue to work, should they wish to.

In summary, the authors are encouraged to publish this important research, but the paper would be stronger for publication and communication of the main messages with a bit more work as outlined above.

General Comments:

The study methods are very strong and the findings informative and novel, but the paper would benefit from a strong edit for language usage, typographical errors and grammar to ensure the successful communication of the findings for readers (see below for some examples of suggested edits).

Other Comments: It might help with the communication of the main findings to consider if there is an alternative phrase to 'working beyond retirement'. Retirement by definition implies not working, so the phrasing is a bit circular or counter-intuitive for the reader and its use in the title, abstract and introduction are distracting from the main messages in these sections. The outcome is defined in the methods but it does not negate the fact that the phrase is challenging. For example, the abstract states that an 'increasing number of retirees continue working beyond retirement'. A retiree is by definition out of the workforce/retired from the workforce/in retirement, so this phrasing is challenging and detracts from the main messages of the section and the paper. Perhaps the following suggested phrasing would be helpful to the reader: 'increasing number of workers continue to work beyond the usual retirement age' or an 'increasing number of workers continue to work when eligible to retire and draw on their pensions'.

The phrase 'registry-connected' is also not intuitive to the reader in the title of the paper. Perhaps this phrase could be dropped as the connection to the registry is clear in the abstract and methods (i.e. - Results from a Dutch cohort study).
Example of suggested edits for the Abstract:

Background: The average retirement age in many European countries is increasing, and an increasing numbers of workers continue to work despite being eligible to retire and drawn upon retirement pensions. Despite the increasing prevalence of chronic disease in an aging workforce, there is little evidence of the influence of chronic disease on retirement decisions. We aim to investigate whether demographic, socioeconomic, work, health, and social characteristics predict working beyond retirement age, and whether these predictors differ for workers with and without chronic disease.

Results: Workers without chronic disease (n=386) were more likely to continue to work beyond retirement age (27%) compared to workers with chronic disease (n=739, 27%). In retirees with chronic disease, work and health factors predicted 10% of the variance in working beyond retirement age, while in retirees without a chronic disease work, health and social factors predicted 22% of this variance. In the final model for workers with chronic disease, healthcare work, better physical health, higher body height, lower physical load and no permanent work contract were positively predictive of working beyond retirement. In the final model for workers without a chronic disease, feeling full of life and having 2 or more days of intense physical activity were positively predictive of working beyond retirement; while handcraft work, better recovery, and a partner who did not support working until the statutory retirement age, were negatively predictive of working beyond retirement.

Conclusions: Work and health factors predicted working beyond retirement for both workers with and without chronic disease, whereas social factors predicted working beyond retirement for only those workers with chronic disease. Demographic and socioeconomic characteristics did not independently predict working beyond retirement for workers with or without chronic disease. Further research is warranted to predict working beyond retirement age for workers with chronic diseases, but the current findings suggest……would welcome a sentence on the importance/implications of the current findings here.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
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Yes

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