**Author's response to reviews**

**Title:** Physical activity patterns in older men and women in Germany: a cross-sectional study

**Authors:**

Anna Moschny (anna.moschny@rub.de)
Petra Platen (petra.platen@rub.de)
Renate Klaassen-Mielke (renate.klaassen-mielke@rub.de)
Ulrike Trampisch (ulrike.trampisch@rub.de)
Timo Hinrichs (timo.hinrichs@rub.de)

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**Author's response to reviews:** see over
Dear Editor

Please find below our response to all points of the reviewer. The changes made in the manuscript (except copyediting) have been marked by coloured font.

Sincerely
Anna Moschny
on behalf of all authors

Reviewers’ comments
Authors’ response

Reviewer: Alain P Gauthier

Reviewer's report:

Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)

1. In table 1, the authors should include p values with their descriptive statistics

   We added p values in table 1 and a remark in the ‘Methods’ section (see “Statistical analysis”, page 7). Additionally, we decided to make table 1 more readable by adding subheadings for variable categories, and by providing only one line of data for the dichotomous variables.

2. The authors do not seem to know the living arrangements of the participants, physical activity patterns (particularly domestic activities) among home-based vs. those in retirement homes or palliative care units would differ greatly. The authors should consider this in their analyses

   This study considers only community-dwelling primary health care patients. We added a description of the selection of patients in the ‘Methods’ section (see page 4/5). Additionally, we added remarks on selection bias at the end of the ‘Discussion’ (see page 14).

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. The authors often begin a sentence with numbers (e.g., p2, paragraph 4: 1, 937 participants). These need to be spelled out.

   Numbers at the beginning of a sentence have been spelled out.

2. The authors need to “tab in” the beginning of each paragraph

   We took the advice.
3. The authors need to review their manuscript for awkward use of transition words: (e.g., Hence nowadays; Albeit; Hereby; But breaking down; Summing up; etc…) 

*Please, see our reply to ‘Major compulsory revisions’ no. 1.*

4. In the introduction, the authors state “To deduce reasonable health promotion and intervention strategies based on current guidelines, both insights into physical activity patterns and a deeper understanding of factors associated with reduced physical activity of specific population sub-groups are necessary prerequisites to take action.” How do the results of this study provide information that are “necessary prerequisites to take action” toward increasing physical activity among the elderly? This needs to be addressed in the conclusion. 

*See our reply to ‘Major compulsory revisions’ no. 2, paragraph 3 (page 3).*

5. The authors have placed their findings within the existing body of literature. However, I would recommend they spend more time reflecting on “what” their findings mean for public health practice. 

*See our reply to ‘Major compulsory revisions’ no. 2, paragraph 3 (page 3).*

**Major Compulsory Revisions** (which the author must respond to before a decision on publication can be reached)

1. The Writing is its current state needs some work. In general, the authors need to revise their manuscript as there are several issues with sentence structure (e.g., Knowledge on physical activity behaviour of elderly people in Germany is scarce and lacking insight into everyday physical activity patterns); grammatical errors (e.g. Discussing own results), and punctuation. 

*The manuscript has been edited by a native speaker from a “Translation and Language Service” having special regard to the reviewer’s comments (sentence structure, grammatical errors, use of transition words).*

2. The major methodological limitation to this study is the lack of a theoretical framework or strong rational for the selection of predictor variables. This is further exemplified by the lack of depth in the ‘Conclusion’ and the absence of an ‘Implications’ section. Specifically, the authors fail to include items such as past activity history, social support or income as covariates, all of which have been found to predict activity levels among the elderly. For instance, if income was included, one may have seen that higher income may lead to increased sporting activities; however decreased domestic activities as 1) they can afford to participate in sporting activities and 2) they may pay others to do household chores. This would have important implications for practice. Much of the predictor variables are illness based (living with a chronic or acute conditions), it is not all that surprising, nor interesting, that persons who are ill are less active. The authors need to reconsider the inclusion of modifiable predictor variables that may inform health promotion practice. 

*We agree that we failed to provide a justification for the selection of potential correlates, and particularly for the inclusion of a broad range of illness based factors. We rephrased the respective introductory section and added a rationale for our focus on physical health-related variables. Please see paragraphs 3 and 4 on pages 3/4.*
As a consequence of adding paragraphs to the ‘Background’ section, the first and fifth paragraph has been shortened in order to avoid a lengthy introduction. We also decided to rewrite the ‘Results’ section (see page 8) according to the focus on categories of correlates.

We restructured our ‘Discussion’ and ‘Conclusions’ in order to add depth to the conclusions, and to clearly point out the implications of our findings for future research on physical activity as well as for public health practice (see pages 14/15). The discussion regarding physical health-related factors has been expanded, and has been slightly shortened in other sections (pages 10-13).

Furthermore, we conform to the remark that important determinants of physical activity have not been included in our analyses. We added this as a limitation of our study (see strengths and weaknesses, paragraph 2, page 14).

Additionally, we would like to add the following comment: We consider physical health-related variables to be important potential predictor variables, amongst others, that may inform health promotion practice. The evidence of consistent associations of certain physical health-related factors with physical activity would heat the discussion about physical activity promotion in chronically diseased older adults. It might raise the following questions: Do general practitioners advise their patients to rest due to certain diseases and functional decline, or do they rather prescribe physical activity? Do significant others relieve chronically ill people from everyday tasks, or do they encourage autonomous activity? Does the social environment in general actually encourage physical activity despite certain diseases, or are chronically diseased older adults not supposed to exercise, or to be physically active? Knowing which physical health-related factors are strongly associated with physical inactivity in older adults would necessarily have implications for future research and health promotion practice.

3. The authors have included a large number of variables in their analyses, I would suggest reducing this number by combining a few (Hypertension;CHD;CHF;PAD = Cardiovascular Disease). I would also suggest the removal of variables for which add no value to our understanding of physical activity behaviour (i.e., Number of medications)

We agree that we included a large number of variables into our analyses. However, cross-sectional studies are suggested to be an efficient and empirical means of screening a broad range of potential correlates of physical activity. Associations in fact do not allow causal inferences, but provide a basis to generate hypotheses. Factors that are found to be consistently associated with physical activity add to our understanding of physical activity levels [1]. Although many studies examined the correlates of physical activity, little research focused on older adults. Therefore, knowledge regarding the correlates of physical activity in this population group is largely inconsistent, especially when relating to different categories of physical activity. We thus purposely included a broad range of variables to explore the associations with physical activity levels (in two activity categories) among older adults. The rationale for considering many health-related factors has been given in the ‘Background’ section. Since our aim was to particularly explore the independent associations of diverse chronic conditions and other physical health-related factors on physical activity levels, we did not take the reviewer’s advice to summarize the single chronic conditions in our analyses. But we removed the variable “number of medications” from our analyses because it in fact does not contribute to the understanding of physical activity behaviour. This resulted in a change of the number of complete cases (n=1609 \( \rightarrow \) n=1610). Data have been reanalysed; all data in the text, tables and figures have been adapted.

4. The authors separated their logistic regression models by gender, this has potential value given that there is an abundance of research to suggest activity patterns of men and women differ. However, the authors state that “several factors emerged to be associated with physical activity in either or both activity domains, for the entire sample, or separately for men or women”. The authors need to provide evidence based on their findings that there are meaningful differences when types of physical activity are compared and when men and women are compared. For instance, how do you explain chronic obstructive lung disease lowers the odds of participating in sporting activities among men, however has no effect on domestic activities among men or neither activity types among women. Why would women who live alone be more active in sporting activities; however this not being the case among men? Being a current smoker seems to decrease the odds of being active in general, with the exception of men in domestic activities. What does this mean?

We decided to differentiate between sexes and activity categories in order to contribute to gender-related research on physical activity, and to the understanding of engagement in diverse activities. We discussed some of the selective findings, and speculated, where appropriate, on reasons for associations in men but not women, or vice versa, or in one activity category but not the other (see ‘Discussion’). However, this is an explorative study. As a consequence, there may be results for which there is no plausible explanation, and that do not have direct implications for health promotion practice. Usually, further exploration is needed to confirm results and the consistency of associations, respectively.

5. In general, the authors present important research questions that merit investigation; however I believe the variables presented only provide a very partial explanation. I would urge the authors to revise their manuscript using more meaningful variables, as well they should reconsider their existing findings beyond their ‘statistical significance’).

Where appropriate, we considered our findings beyond their statistical significance (see discussion, pages 10-13). However, the odds ratios of most non-significant associations were close to 1. We thus preferred not to over-interpret our results.

We agree that our findings provide only a partial explanation for physical activity behaviour, and we would have loved including some more psychological, social or environmental variables into our analyses. However, we did not assess them in our study.

On the other hand, we believe that analyses of correlates or determinants may always provide only partial explanations of physical activity behaviour, since it is hardly possible to include all potential predictors in one study. The focus of our study therefore lay on physical health-related factors in order to add knowledge with regard to these potential predictors of physical activity behaviour in older adults.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Not suitable for publication unless extensively edited

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: I declare that I have no competing interests