Title: Tibiofemoral osteoarthritis affects quality of life and function in elderly Koreans, with women more adversely affected than men

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Author's response to reviews: see over
Dear reviewers,

Thank you very much for all those helpful recommendations to improve my paper. The paper was revised according to the recommendation.

Reviewer 1 (highlighted in sky blue)

1. The research question is well-defined. However, the gender differences found in this study (in accordance with previous Asian studies) seem to me to be an equally important question. In its current formulation, this is stated as a secondary question. I advise putting it as a primary question and to discuss the findings in such a way that we can take lessons out of these findings. Why is tibiofemoral OA more prevalent in women in Asia in contrast with European and US studies? Why do women have worse scores than men regardless of the presence of tibiofemoral OA? Is occupation a factor? Or culture? Obesity? Co-morbidity? Depression? Appreciating the gender differences found in the evaluation of OA using questionnaires and function test, what do we need to consider in future studies?

- Abstract, background, and discussion parts (p12,13) were revised (highlighted in sky blue).

2. The lack of lateral radiographs and skyline radiographs to assess patellofemoral OA has been stated as a limitation of the study. However, the relevancy of lateral and skyline radiographs, meaning the difference it may have had on the outcomes of the study is not discussed. Is it possible that Asian women are more likely to have patellofemoral OA and that missing this on the radiographs may explain the gender differences?

- This point was added in the discussion, page 13.

Discretionary Revisions:

1. I advise to mention the gender differences in the title and to state the main finding in conclusion in the title: for instance: “Tibiofemoral osteoarthritis affects quality of life in the Korean elderly population, women being more adversely affected than men.”

- The title was changed to “Tibiofemoral osteoarthritis affects quality of life and function in elderly Koreans, with women more adversely affected than men.”
Reviewer 2:(highlighted in green)

1. It would be helpful to describe the design of the study more clearly in the abstract and methods section; a cross-sectional study.
   - The remarks were added in the abstract and text(page 6)

With regard to the abstract: In the abstract “worst category of WOMAC and physical performance test” were used. Could you describe that more precisely? As I understand it correctly, you mean worst quartile?

Further a regression analysis is done to compare OA to non-OA: how OA is defined?
   - The sentence was changed to “The odds ratios for belonging to the worst quartile of WOMAC and physical performance test were calculated by logistic regression analysis in radiographic knee OA compared to non-OA after adjustment of confounders.” page 3-4.

In the abstract, the number of participants and a short description of the participants (age, sex) would be helpful; many readers only read the abstract.

The following sentence was added in the Methods section, “The mean age of the 504 study subjects was 70.2 years and 274 (54%) were women.” Page 3.

Could you give some results in the results section, so OR (95%CI) in numbers. This makes the abstract more informative and attractive to read.
   - The ORs for worst WOMAC category were included in page 4.

Your conclusion involves especially Korean elderly; is it in line with other Asian and non-Asian populations?
   - We believe so, but we need more data because few detailed studies examining changes in QoL and physical function were performed in Asia. A report from Singapore revealed substantially worse bodily pain and physical function scores among patients with hip or knee OA compared to the general population, and this point was mentioned in the discussion.

Page 6. Could you explain what is meant by 200 of 1,408 census tracts?

- The study participants were recruited from the city of Chunchun and its vicinity which included 1408 administrative districts. Among these, 200 districts were randomly selected. Page 10, line 3 and 4: the percentage men and women are difficult to understand? Could you also give absolute numbers?
   - Absolute values were provided in the text, page 10.
What is BMI, OA severity and mean/median WOMAC and SF-12 score in the total group?

- Mean BMI for the whole group was 24.6±3.3.
- Please find the following tables.

### WOMAC scores (mean±SD)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Both Sex (N=304)</th>
<th>Men (N=230)</th>
<th>Women (N=74)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (0-500)</td>
<td>72.7±337.2</td>
<td>145.5±147.5</td>
<td>112.3±254.7</td>
<td>0.001</td>
</tr>
<tr>
<td>Stiffness (0-200)</td>
<td>25.6±116.7</td>
<td>53.5±63.6</td>
<td>40.7±104.4</td>
<td>0.003</td>
</tr>
<tr>
<td>Function (0-1706)</td>
<td>234.3±1144.5</td>
<td>458.1±474.1</td>
<td>356.0±554.8</td>
<td>0.003</td>
</tr>
<tr>
<td>Total (0-2400)</td>
<td>98.2±471.0</td>
<td>199.0±204.7</td>
<td>153.0±355.4</td>
<td>0.001</td>
</tr>
</tbody>
</table>

### Prevalence of knee OA

<table>
<thead>
<tr>
<th>Sex</th>
<th>Radiographic OA (N/L≥2)</th>
<th>Severe OA (N/L≥3)</th>
<th>Symptomatic OA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unilateral</td>
<td>Bilateral</td>
<td>All</td>
</tr>
<tr>
<td>Both sexes  (N=304) (%)</td>
<td>77 (25.8)</td>
<td>111 (36.8)</td>
<td>188 (62.4)</td>
</tr>
<tr>
<td>Men (N=230)  (%)</td>
<td>20 (8.7)</td>
<td>10 (7.0)</td>
<td>30 (13.0)</td>
</tr>
<tr>
<td>Women (N=74) (%)</td>
<td>57 (20.8)</td>
<td>93 (34.7)</td>
<td>152 (55.5)</td>
</tr>
</tbody>
</table>
Page 10 and Table 2. It is not quite clear how the means for OA and non-OA are calculated. Could you explain this more extensively in the methods section?

- The following paragraph was added in page 9.

“Mean scores for SF-12 items were analyzed using general linear models (GLM) to control for factors influencing SF-12 scores. The mean scores were compared between subjects with OA and subjects without OA entering age, BMI and sex as covariates. In addition, sex-specific comparisons were made between subjects with and without OA entering age and BMI as covariates. Comparison between male and female OA subjects were made entering age, BMI and OA severity defined as K-L grade as covariates.”

Discussion, page 12, line 3: For me the conclusion is not so clear. The authors state that “lower-extremity physical performance was also adversely affected”, however their data does not support this conclusion, since not difference was seen between OA and non-OA after adjustment. Please explain your statement.

The same as for line 5 and page 14, the conclusion.

- This is a difficult part. Table 4 shows that OA subjects do worse in usual walk and chair stands after adjusting age and BMI. However, after adjustment of sex, the OR becomes non-significant. We interpreted this as ”physical performance test is affected more by sex than by the presence of OA”, rather than as “The presence of OA does not affect lower extremity function.” However, sex-specific analysis revealed significance only in usual walk among male maybe due to small sample size.
Thus, we omitted the statement “lower-extremity physical performance was also adversely affected” in the discussion and conclusion as the reviewer suggested.

I have some minor essential revisions.

Page 8: were all radiographs read twice or only a sample?
- All radiographs were read twice.

Page 9: normal radiograph (non-OA): is this K-L score 0 or 0 and 1?
- Non-OA is defined as K-L grade 0 or 1. The sentence was corrected (page 9).

How OA severity is defined?
- OA severity is defined by K-L grade. It was used for adjustment in regression analysis or GLM as categorical independent variables.

Concerning SF-12: it is not clear what is meant by combining worst scores (0 and 1 …)?
- With due respect, the phrase refers to physical performance test which is a categorical variable, and not SF-12. Standing balance was scored as described in the methods, and worst scores, 0 and 1, were combined.

Page 10: The method used to make a comparison between OA and non-OA can be described in the Methods section, not in the results section.
- The changes were made accordingly.

Editorial comments (highlighted in yellow)

1. Please ensure that 'OA' is defined in your revised abstract.
- OA is phrased as osteoarthritis (OA) in the abstract. --- page 3

2. Informed consent must also be documented in your manuscript.
- The following sentence was added in page 6. “Written informed consent was obtained from all the study participants.”