Reviewer’s report

Title: Associations between health-related quality of life, physical function and pain in older women with osteoporosis and vertebral fracture

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Reviewer: Monica Perracini

Reviewer's report:

The research on vertebral fractures is relevant and the burden upon individuals and health systems will dramatically increase in coming years. However, the literature gap for conducting the study was not clearly presented. Authors mentioned that there is few studies that aimed to understand the impact of pain, decreased muscle strength, balance and walking speed on health-related quality of life but did not present what are still unclear or uncertain about this topic.

Also, the point of investigating the association of a generic and specific HRQoL instrument was not supported by the literature. The subdomains associations were not explored, as it should have been, otherwise it's not necessary. A multicollinearity analysis should be performed and reported.

The discussion did not reflect the results, since the main point raised by authors was that pain and slow walking speed were independently associated with quality of life. But, this sample has specific characteristics: high functioning older women, with low pain intensity. This should be kept in mind.

Page 5-line 21 - systemic disease rather than systematic

Page 5-line 26 - use and instead of with; and vertebral fractures are the most common…

Page 6- line 19 to 27 - review this whole sentence since physical impairment is a domain of body/systems dysfunction and the limitation in activities is related to the individual. You probably meant to say that there is a downward spiral of decline in physical function due to pain, decreased strength and flexibility that might result in activity restriction and decreased mobility which in turn increase the risk of new fractures.

Page 6-line 49 - please include references for the few studies, and clarify what relationship are you talking about (walking speed and HRQoL?)

Page 7-line 1 to 3 - did you mean women in the percentile 75? Please rewrite this sentence. It's unclear.
physical function or physical functioning. It's important to use the ICF concept and adequate terminology. Body dysfunction or impairments may result in incapacity to properly execute some motor tasks, such as walk at a normal speed and in limitation in ADLs or IADLs.

Page 8-line 13 - the statistical approach here is unnecessarily mentioned.

Page 8-line 57 - please rephrase: to be eligible instead of to be found eligible.

Is there a difference in pain and other variables according to the number of vertebral fractures? A subgroup analysis was expected or planned?

Page 8-line 1 - Who was responsible for identifying the fracture? Did these professionals receive any specific training or had any level of expertise?

Page 9-line 29 - body mass and comorbidities are not sociodemographic outcomes

Page 11-line 1 - FR is in fact a test that measures the capacity to reach forward in an anticipatory postural adjustment task. It reflects only one aspect of balance and is very limited in its scope.

Page 11-line 13 - muscle strength in the upper limb was measured using a test much more related to fatigue resistance than strength. Was it performed with loads?

Page 11-line 26 - only pain intensity was measured.

Page 12-line 1 - What is the rationale for investigating the association between a generic and a disease-specific HRQoL?

Regarding multicollinearity, how was it identified? Was FIV considered? This is particularly important to assure that pain and physical function were independently associated to HRQoL overall score and subdomain scores.

Page 12-Line-46 - insert BMI kg/m²

Page 13 - Table 1 - What comorbidities were observed? What about ADL and IADL? Please consider reporting 95% CI for all numerical variables.

Table 2a and 2b - please review the table editing

Page 15-line 29 - this conclusion is only accepted if collinearity was tested.

Page 15-line 49 - But the pain intensity observed in the study was quite low 3.4. How did you explain that? It would be good if authors present 95% CI of pain, minimum and maximum values and also the percentage of participants with low, moderate and severe pain intensity. This is
relevant since even low pain intensity might have negative impact on HRQoL. A better exploration of data should be conducted.

Page 15-line35 to 51 - please consider rewriting this paragraph that is lengthy and confusing. What are the contradictory results of Davis et al? In what extent does the present study improves the knowledge about walking speed and HRQoL? My impression is that the results do not support a downward cycle, since increased pain intensity was not observed and, probably the sample was composed by high functioning older women.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

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

No

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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