Author’s response to reviews

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

Authors:

Brita Stanghelle (bsugland@oslomet.no)
Hege Bentzen (hegben@oslomet.no)
Lora Giangregorio (lora.giangregorio@uwaterloo.ca)
Are Pripp (apripp@oslomet.no)
Astrid Bergland (astridb@oslomet.no)

Version: 1  Date: 24 Jul 2019

Author’s response to reviews:

Oslo, 24 th of July 2019

Dear Editor of BMC Geriatrics,

Masami Akai

BGTC-D-19-00203

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

Brita Stanghelle, Ph.D - student; Hege Bentzen, PhD; Lora Giangregorio, PhD, Associate Professor; Are Hugo Pripp, Professor II; Astrid Bergland, Professor

Thank you for the possibility to resubmit the manuscript BGTC-D-19-00203 after major revisions. We appreciate the editor’s and reviewers’ interest and thoughtful letter in response to our article. We have, as you recommended, revised the manuscript along the lines suggested by the editor and reviewers.

A point-by-point response to all the comments of the reviewers is included at the end of this letter. All changes to the manuscript are indicated in the text by track changes.
This manuscript describes original work and is not under consideration by any other journal. All authors approved the manuscript and this resubmission.

Thank you for receiving our reviewed manuscript and considering it for publication. We appreciate your time and look forward to your response.

On the behalf of all authors,

Brita Stanghelle
PhD-student
Corresponding author

Editor Comments:

The research on vertebral fractures is extremely important and meaningful for the aged society because such fractures have great burden upon individuals and health systems. However, I am afraid that entry criteria are not well defined. For example, it is not easy task to diagnose vertebral fracture by plain X-ray, in which both fresh one and old one could be included. And it is also difficult to assess pain derived from osteoporotic fracture.

Response from authors: Thank you for your comments, we agree that research on this field is very important. The entry criteria are now better described. The vertebral fractures were diagnosed both by DXA or x-ray by medical doctors. Page 8, lines 171-174

We have made corrections in the text indicating that the pain instrument applied, measures global pain intensity, which indicate that our intention was not assess pain derived from osteoporotic fracture only. Page 11, lines 233-235

Charlotte Beaudart (Reviewer 1): This is an interesting manuscript with appropriate statistics. Nevertheless, the reviewer has some comments in order to improve the manuscript. Authors are invited to review their manuscript.

Response: Thank you for the opportunity to review the manuscript. We appreciate that you find our manuscript interesting, and for your valuable comments for improvement of the manuscript
Reviewer 1: Introduction should be reduced. The funnel of the introduction is good but too much details are given with some of them deserving to be presented in the discussion section instead. Information should be synthetized. Moreover, the plus-value of the manuscript is not clearly presented through the introduction.

Response: Thank you for your comments. We agree that the introduction might be too detailed. We have now reduced the introduction by cutting back on some of the details, synthetized more of the information and moved some to the discussion. Pp 5-7

We have also tried to present the plus-value more clearly. Page 6 and 7, lines 133-145

Reviewer 1: It is not clear why authors are presenting some psychometric properties such as internal consistency and floor and ceiling effects in this manuscript. This is out of topic. Moreover, results of the internal consistency are given in method section, which is unappropriated, and results of floor and ceiling effect are not reported at all.

Response: Thank you for your comments. Our intention with mentioning internal consistency was to investigate whether the instrument was appropriate for our study population. However, we realize that reporting internal consistency might be out of topic, so we have deleted it from this manuscript. Floor and ceiling effect are of importance with respect to report actual variation in the sample score. Those with top score could potentially achieve even higher scores if the scale had that possibility. Ceiling effect is reported in the manuscript, we found no floor effect. Ceiling effect is reported on page 12, line 267-268. There were no floor effect.

Reviewer 1: Were the measures of physical function standardized? Were these tests assessed by different clinical researchers?

Response: Thank you for your questions. Yes, all the tests for physical function are standardized tests with written protocols that were followed. The tests were assessed by different physiotherapists, who all received training in the test-procedures. Page 10, lines 213-215

Reviewer 1: - Why did the authors not investigate results for the MCS and PCS scales of the SF36 questionnaire?

Response: Thank you for noticing this. Analyses and results of the MCS and PCS are now reported in table 1, table 2a, and as univariable regression in additional file. Table 1, Table 2a, Additional file
Reviewer 1: From a clinical point of view, it could be interesting to have a comparison between the generic tool used and the specific tool used. Is the specific tool more associated with physical function?

Response: Thank you for your interesting question. This is an important clinical question, and we have clarified it better in the discussion section. Page 17, line 366 - 371

Monica R Perracini, PT, PhD  (Reviewer 2): The research on vertebral fractures is relevant and the burden upon individuals and health systems will dramatically increase in coming years.

Response: Thank you for valuable comments and for recognizing the relevance of this study.

Reviewer 2: 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.

Response: Thank you for your valuable comment. The introduction is revised according to your recommendation. We have written more clearly about the knowledge gap and why this study is of importance. Pp 5 – 7

Reviewer 2: Also, the point of investigating the association of a generic and specific HRQoL instrument was not supported by the literature.

Response: Thank you. References are now added. In addition, we’ve added some more about disease-specific instruments in the paragraph about HRQoL instruments and in the discussion session as well. Page 7, line 152, Page 9, lines 203-205, Page 17, lines 361-371

Reviewer 2: The subdomains associations were not explored, as it should have been, otherwise it's not necessary. A multicollinearity analysis should be performed and reported.

Response: Thank you for valuable comments. Multicollinearity analysis are performed, information about this is now given in the manuscript. Page 11, lines 250-252
Reviewer 2: 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.

Response: Thank you for your comments. We have revised the discussion section with awareness of our sample’s characteristics. Pages 16-18. This is also included in limitations. Page 18, lines 383 – 384

Reviewer 2. Page 5-line 21 - systemic disease rather than systematic

Response: Thank you for noticing. The sentence is deleted due to revision

Reviewer 2: Page 5-line 26 - use and instead of with; and vertebral fractures are the most common

Response: Thank you for noticing. This is now corrected. Page 5, line 95

Reviewer 2: 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.

Response: Thank you for your comments. The paragraph is revised according to your comments. Page 5-6, lines 111-115

Reviewer 2: Page 6-line 49 - please include references for the few studies, and clarify what relationship are you talking about (walking speed and HRQoL?)

Response: Thank you for noticing. Corrections have been made. Page 6, line 119

Reviewer 2: Page 7-line 1 to 3 - did you mean women in the percentile 75? Please rewrite this sentence. It's unclear.

Response: Thank you for your comments. The sentence has been rewritten. Page 6, line 121-125
Reviewer 2: Page 7-line 29 to 30 - 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.

Response: Thank you for your comments. The paragraph has been rewritten. We totally agree that ICF is an important framework for osteoporosis. It is valuable as a comprehensive framework for understanding of the dimensions of health that affect people with OP than osteoporosis specific questionnaires (Binda AC et al: Functioning of active postmenopausal women with osteoporosis Fisioter Mov. 2017 Oct/Dec;30(4):797-803; Christina Ziebart, Allyson D. Page & Joy C MacDermid (2019): Application of ICF conceptual framework in Osteoporosis, Physiotherapy Theory and Practice, DOI: 10.1080/09593985.2018.1563932). However, we decided not to adhere to the core set of ICF for osteoporosis in this study, as we considered it too extensive for the scope of this study. Page 6-7, line 133-145

Reviewer 2: Page 8-line 13 - the statistical approach here is unnecessarily mentioned.

Response: Thank you for your comments. The sentence has been deleted. Page 7

Reviewer 2: 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?

Response: Thank you for noticing. The sentence is corrected. Unfortunately, we don’t have information about the numbers of vertebral fractures the participants had, so for that reason no subgroup analyses were planned. Page 8, Line 170

Reviewer 2: Page 8- line 1 - Who was responsible for identifying the fracture? Did these professionals receive any specific training or had any level of expertise?

Response: Thank you for your question. The fractures were identified by medical doctors trained in osteoporosis in a clinical setting at a hospital or outpatient clinic. This information is included in the manuscript. Page 8, lines 174

Reviewer 2: Page 9-line 29 - body mass and comorbidities are not sociodemographic outcomes
Response: Thank you, we’ve changed the headlines to “sociodemographic and background variables”. Page 8, line 182

Reviewer 2: 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.

Response: Thank you for your comments. We are aware of the many aspects of balance and that FR only represent limited aspects. Due to restriction of number of independent variables we made a choice to include FR representing balance. FR was also chosen since it is widely used in many studies. We have corrected information about FR in the manuscript. Page 10, line 219-221

Reviewer 2: 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?

Response: Thank you for noticing. The test was performed with a manual of 5 lb (2.27 kg) for women. Information is added to the text. Yes, arm curl test, as a part of Senior Fitness Test, is a test measuring upper limb strength. Page 10, line 225

Reviewer 2: Page 12 - line 1 - What is the rationale for investigating the association between a generic and a disease-specific HRQoL?

Regarding multicollinearity, how as 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 score

Response: Thank you. The rationale for investigating both a generic and disease-specific HRQoL instrument is now included in the manuscript. Multicollinearity was identified by correlation and tests of tolerance and VIF. Page 7, line 152, Page 9, lines 203-205, Page 17, lines 361-371, Page 11, lines 250-252

Reviewer 2: Page 12 Line-46 - insert BMI g/m²

Response: Thank you, corrected to kg/m². Page 12, line 263
Reviewer 2: Page 13 - Table 1 – What comorbidities were observed? What about ADL and IADL? Please consider reporting 95% CI for all numerical variables.

Response: Thank you for your comments. Comorbidity was defined as 4 or more self-reported diseases. Participants choose from table with predetermined diseases such as stroke, heart disease, lung disease, insomnia, headache, depression, anxiety, hypertension, low bloodpressure, amputation, paralysis in legs, Parkinson, Diabetes, rheumatic disease, arthrosis in knee, arthrosis in hip, hip fracture, wrist fracture. In addition they were to report other diseases if applicable. Table 1 is revised, and reports minimum-maximum for all the numerical variables. ADL/IADL: due to number of independent variables, we did not include information about ADL/IADL. However, many of the questions in the HRQoL instruments ask about similar topics. 95% CI for numerical variables are now reported in table 1. Table 1

Reviewer 2: Page 15-line 29 - this conclusion is only accepted if collinearity was tested.

Response: Thank you, multicollinearity was tested. Page 11, lines 250-252

Reviewer 2: 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.

Response: Thank you for your comments. We relate the relatively low level of pain to the high level of functioning the participants have. Table 1 is updated with min-max values, and categorization of mild, moderate and severe pain and 95% CI of continuous variables. Table 1

Reviewer 2: Page 15-line 35 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.

Response: Thank you for this comment. We’ve removed the sentence about contradictory results in the process of revision. The paragraph is now revised and rewritten. Page 16-17, lines 335-359.

Our results can not say anything about development in pain intensity, since the study is cross-sectional. We agree that the sample have high functioning women with low pain intensity.
compared to the general population of people with osteoporosis and vertebral fracture. This is clarified in limitations. Page 20, lines 383-384

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

Response: Thank you, the tables are edited. Table 2a and 2b