**Author's response to reviews**

**Title:** The Brazilian Portuguese version of the revised Maastricht Upper Extremity Questionnaire (MUEQ-Br revised): translation, cross-cultural adaptation, reliability, and structural validation

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**Author's response to reviews:** see over
To Editors of BMC Musculoskeletal Disorders
Daichi Hayashi, Boston University School of Medicine
Umile Giuseppe Longo, University Campus Biomedico
Ali Mobasheri, University of Surrey
Jasvinder Singh, University of Alabama
J. Bart Staal, Radboud University Medical Centre
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(Editor in chief of BMC Musculoskeletal Disorders)

Second revision of the paper entitled:

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Research article
The brazilian portuguese version of the Maastricht Upper Extremity Questionnaire (MUEQ): translation, cross-cultural adaptation, reliability and confirmatory factor analysis
Aline M Turci, Debora B Grossi Prof, Carina F Pinheiro, Marcela M Bragatto and Thais C Chaves Prof
BMC Musculoskeletal Disorders (Section: Epidemiology of musculoskeletal disorders)

It is a great pleasure to resubmit this original paper titled “THE BRAZILIAN PORTUGUESE VERSION OF THE REVISED MAASTRICHT UPPER EXTREMITY QUESTIONNAIRE (MUEQ): TRANSLATION, CROSS-CULTURAL ADAPTATION, RELIABILITY, AND STRUCTURAL VALIDATION” to the appreciation of the editorial board of the BMC Musculoskeletal Disorders.

We really appreciate all the commentaries and suggestion and have made a great effort to answer to each question raised by reviewers, to make the statistical revision requested, methods and English review as recommended by Associate editor. All the points raised by reviewers were answered in point-to-point response document highlighted in blue. In this way, we believe on the significant contributions of this paper to actual knowledge about this topic.

Best regards,

Prof. Thais Cristina Chaves
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In addition to the points raised by the reviewers, please address the following points:

1. The MUEQ instrument
   The final part of the translated questionnaire included the “complaint section” items related to the frequency and the nature of the neck and upper arm complaints. At the same time, there were questions involving the clinical nature of the complaints.
   It seems that this wording is the same as in Bekiari. A validation study and psychometrical evaluation of the Maastricht Upper Extremity Questionnaire (MUEQ) for the Greek-speaking population. J Musculoskeletal Neuronal Interact 2011; 11(1):52-76. Since it is a very small paragraph I do not consider this problematic, but I will prefer that you to state this in your own words.

   Answer: The paragraph was rewritten (page 7).

2. Results/ Cross-cultural adaptation, Pre-final Test and Reproducibility of the MUEQ-Br.
   This section is hard to follow because it is not clear whether all the citations are from the English translations or they are translations of the Portuguese wordings. I suggest that you make this part less detailed and just mention that the back translation to English resulted in some minor cultural linguistic adaption that did not change the content of any items (as far as I understand).

   Answer: The suggestions were made (pages 11 and 12).

3. Discussion
   ?? the results of the Confirmatory Factor Analysis suggested that the process was adequately conducted.? It appears that the positive results of the final CFA model are taken as a proof of an adequately conducted cross-cultural adaptation process. However, I believe the CFA mainly confirms if a pre-specified factor structure can be found in the dataset. I suggest it is stated here which factor structure was supported.

   Answer: The statement was revised (page 14, first paragraph).

4. Discussion
   “The reproducibility of the MUEQ-Br tool and subscales could be considered as adequate and the sample size too [20].”
   I think the intention was to state that the reproducibility was adequate and suggest you word this more firmly than “could be considered as adequate” since that does not really tell if you consider it adequate.

   Answer: The statement was revised (page 14, second paragraph).

5. Discussion
   I don’t find it necessary to repeat the nine questions that did not fit the structure.
   I think you should clearly address whether the 41-item Portuguese version actually can be considered the same questionnaire as the English 59-item version.

   Answer: As the MUEQ-Br showed adequate fit values according to confirmatory factor analysis with 41 questions, despite of the 59 question from the original MUEQ, we could not affirm that both are the same questionnaire. Since
we propose the use of the term “revised” to better describe the Portuguese version of the MUEQ with 41 items. Modifications were performed throughout the text.

6. I guess I have missed something, but it is not clear to me how the original 59 items were reduced to 41 since I got the impression that only 9 items were removed.

Answer: We have tested confirmatory factor structure of three different models (see table 4 – page 28). The model of Eltayeb et al. consisted of only six domains and 50 questions (the work environment domain was excluded – with nine questions) showed the better values, but more nine questions were not significant in the model in the Brazilian Portuguese version. In this way, in fact 18 questions were excluded in the Brazilian Portuguese version. We made a great effort to make it more clearly stated on this new version of the paper (page 15, first paragraph).


ANSWER TO REVIEWERS – POINT BY POINT

Reviewer: Henrik Hein Lauridsen
Reviewer’s report:
General comments
I have read the answers by the authors, and they have given explanations for the issues I raised. Secondly, almost all of my concerns/suggestions have been followed and the manuscript changed accordingly. However, it was rather difficult to track the changes as not all of them were highlighted in yellow. Lastly, I still recommend the manuscript to be proof-read by a native English speaking person as several of the sentences needs typing or grammatical correction.

Answer: The paper was revised by a native English speaker (Editage – certificate of revision attached)

Major compulsory revisions

Page 6: “The Work Environment domain was excluded from the Brazilian Portuguese of the MUEQ according to confirmatory factor analysis.”. I recommend that this is reported only in the results section and not in the section on describing the original MUEQ. Second, when a domain is removed from the MUEQ-Br, the total sum score is not comparable to the original version, and this needs to be acknowledged.

Answer: The sentence “The Work Environment domain was excluded from the Brazilian Portuguese of the MUEQ according to confirmatory factor analysis” was excluded from the methods section.

A brief description of the new score system was included on table 3 – pages 26 and 27.

Page 7: “The total sum of the questionnaire is 156 points. Greater the sumscore, greater the perception of the worker about the interference of psychosocial and ergonomics aspects on work context.”. What is the rationale behind summing different dimensions when most textbooks on this advice against it? (e.g. [1, 2]). The problem is if one dimension goes up and another goes down, the total score stays the same.
Answer: Thank you for the advice. We really agree with the reviewer. We excluded the sentence (The total sum of the questionnaire is 156 points. Greater the sumscore, greater the perception of the worker about the interference of psychosocial and ergonomics aspects on work context) from the final version of the paper.

Page 8: The incomprehension index. I am curious why the authors believe that if up to 1/5 of the respondents do not understand the question this is OK? To me it would pose a serious problem if say 15% of my target population did not understand a particular question. Please provide references on the incomprehension index and the cut-off of 20%.

Answer: Once more thanks for the commentary. This statement was removed from the text since our index of doubts or suggestions for the questions that remained on the final version of Brazilian Portuguese MUEQ was very low from the total sample size of 55 volunteers (page 8, last paragraph and page 11, last paragraph).

Page 9: It says: “On Cross-cultural studies the better solution is the use of Confirmatory Factor Analysis.” Confirmatory FA is used if the dimensional structure of the questionnaire is known either from previous research or from a conceptual model, not when the questionnaire is cross-culturally adapted.

Answer: The statement was revised. Please, see page 10, third paragraph.

Page 12: “the Item-Total Correlation of each domain was between 0.28 and 0.73, inside the range recommended as acceptable (0.2 – 0.8) [27]” Reference 27 is “De Vet HC, Adèr HJ, Terwee CB, Pouwer F. Are factor analytical techniques used appropriately in the validation of health status questionnaires? A systematic review on the quality of factor analysis of the SF-36. Qual Life Res. 2005, 14(5):1203-18.” To the best of my knowledge, this reference does not talk about item-total correlations. Please use a proper reference.

Answer: The corrections were performed on page 12, fourth and on references (29. Ferketich S. Focus on psychometrics: Aspects of item analysis. Research in Nursing & Health 1991; 14, 165–168.)

Page 10 and 13: CFA and omission of the “The Work Environment domain” It is difficult to follow why the two initial models (7 and 6 factors) were included in the CFA other than the fact that they are reported in the literature. However, are these two models based on a conceptual model or purely driven by statistical findings (e.g. EFA)? Why should we choose one model over the other? Please be a bit more specific as to your choices when testing using CFA. Second, the authors choose to omit the “Work Environment domain” and then further reduce the MUEQ by omitting nine questions (15% reduction in items). This totally changes the questionnaire compared to the original version, and I therefore believe it is a different instrument which needs to be addressed in the paper.

Answer: The explanation of the conceptual model of MUEQ was described on the revised manuscript (pages 12 last paragraph). As recommended, we really agree that the 41-item Brazilian Portuguese MUEQ is a new questionnaire and for this reason we included the term “revised” on the new version of the manuscript throughout the text.

Reviewer: Arul Earnest
Reviewer's report:

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

1. Is the question posed by the authors well defined?
The authors state that their objective was to describe the process of cross cultural adaption of the MUEQ to Brazilian Portuguese and verify the psychometric properties.

2. Are the methods appropriate and well described?
The authors sampled office workers from one institution only. How would this relate to the generalizability to all the office workers in Brazil? Is it possible that tertiary institutions have well-designed and ergonomic work-stations and hence provide for less variability than we would expect with a broader population?

Answer: The first paper submitted to BMC musculoskeletal Disorders was an epidemiologic and validation one. However, the reviewers suggested that the paper was reduced and Confirmatory Factor Analysis applied. In this way, it was suggested that the prevalence data were removed from the paper and the main aim of this study focused on describe the process of cross-cultural adaptation and to verify the psychometric properties of the MUEQ-Br. We agree with the commentary and we included this aspect as a limitation of the present work. However, the aim of this paper was only to demonstrate that the translated MUEQ was validated to be used to assess biopsychosocial aspects of computer office work and not described the prevalence or the biopsychosocial profile of Brazilian computer office workers. In this way, this aspect not compromises the contribution of this paper. By the other hand, an important aspect is the education level of the Brazilian population. However, office workers in Brazil must have at least the high school degree completed to work or a technician formation, and they need to receive at least 11 years of formal education. Thus, considering that the same education level is necessary to office worker in Brazil, probably computer office workers from different parts of Brazil will understand the concepts of the Brazilian Portuguese version of MUEQ. Such aspects were discussed in the new version of the paper (page 17).

The tertiary institution considered in this study is a public one. Considering the social and economic reality of public institutions on Brazil, definitively, such institutions do not have better ergonomics conditions than the broader population.

241 of the original 627 participants did not respond to the study on confirmatory factor analysis. This, unfortunately is the weakest link of this study. The authors point to the earlier study by Eltayeb et al, which has a lower response rate of 44%, unfortunately two wrongs do not make it right.

Answer: Sorry for the mistake. The description of the response rate of Eltayeb et al (2007) was used only to make comparisons and show that in a similar study using the same tool the response rate was low.

Do the authors have data on the demographics profile of those who did not respond? If not, perhaps even comparing the profile of the respondents with broad institution profile might alleviate this problem somewhat.

Answer: We don't have the demographics profile of those who did not respond; since in Brazil ethics committee enables such kind of practice (Refusal to participate enables collection of any data from volunteer, considering that they need to give a formal consent – signature).
We have limited information about broad institution profile, but we have tried to incorporate some of these aspects (demographics profile: Methods – page 5, first paragraph and education level: Discussion – page 17, second paragraph).

As another way of justification, the authors point out that sample size is adequate. However, sample size may not necessarily fix the problem of representativeness and that statement should be removed.
Answer: The statement was removed from page 14.

My basic concern is that only a subset of the original participants approached responded, and when they did, they took a relatively short time to answer the questionnaire. What is the correlation between the levels of agreement and consistency shown with time taken to fill the questionnaire?
Answer: We have tried to answer this question since it was an interesting point of view. However, Intraclass Correlation Coefficients are calculated for samples and not individually. In this way, we decided to calculate the standard error of measurement (SEM as suggested by Weir et al, 2005) between test-retest scores on MUEQ for each subject for the sample of reproducibility study. We verified absence of correlation (Spearman Ro = 0.072, p= 0.61) between the time duration to complete the questionnaire and error between test-retest scores. It was described on the new version of the paper (Statistical Analysis – page: 10, second paragraph and Results: page 12, second paragraph).

Page 5: Usual to present standard deviation for age, instead of the CI. Also use 95% CI instead of CI 95%
Answer: Thanks for suggestion. We included the standard deviation for age on the text (pages 5 and 6) but the use of confidence intervals was maintained to make easier the profile comparisons among the groups from the different phases of the study as recommended. We revised the error on the new version of the manuscript throughout the text.

Table 1. Need to explain what this prevalence means in the column header
Answer: We described the method of calculation of the prevalence (table 1, page 24). Thanks for correction.

Besides the age description of the subset of 55 individuals involved in the cross-cultural adaptation, can the authors present other demographics/computer usage to determine generalizability?
Answer: This information was described in the last version of the paper, but we have included new data. In the new version, we discussed the differences between groups (page 5 third paragraph and Results, page 12, third paragraph)

Is there any explanation why the participants took a shorter time to complete (15 mins) compared to 20mins as reported? Is there a possibility that the participants rushed through the questions?
Answer: Thanks for the observation. It was an error and was corrected at the new version of the paper (page 6, last paragraph).
We really could not assert that the participants who decided to participate of this study answered the questionnaire honestly. However, the reproducibility rates demonstrated acceptable levels and it as parameter of accuracy and reliability.
That is the problem of the lower response rate; the participants which are not interested to complete the long questionnaire were frankly and refused to adhere. Since they knew it was a research (we are not from the health work departure of the University) and they were not constrained to adhere. We discussed such aspects on the new version of the manuscript (pages 16 and 17).
For the pre-final version test, what is the profile of the 15 subjects as compared to the other groups (validation, etc)?

Answer: The profile of the 15 subjects on the initial pre test phase was added at this version of the manuscript (page 5, third paragraph).
As recommended we included the profile of 15 subjects of the initial pre test phase and compared to the other groups. It was verified a difference between the mean ages between groups considered in the different phases of the study. Instead of the statistical difference all the groups demonstrated that 95% confidence interval was in the third decade of life, demonstrating a statistical difference, but without physiological implications. Moreover, it was not found difference between years of computer use at work (average of 10 to 13 years).

This statement was inserted at the new version of the manuscript (Results page 13, second paragraph).

7. Are limitations of the work clearly stated?
Limitation of the poor response rate needs to be better discussed
Answer: These aspects were discussed on the new version of the paper.

9. Do the title and abstract accurately convey what has been found?
Words that describe methodology like confirmatory factor analysis should be avoided in the title
Answer: The “confirmatory factor analysis” was removed from the title (Page 1).

10. Is the writing acceptable?
No. The article will benefit from English language editing. Lots of spelling errors e.g. see page 7, last para the “complaint section”, dutch in page 8, etc.
Answer: The paper was revised by editage (certificate of revision attached).