

Author responses to first review:

Reviewer #1: This is a well-written manuscript detailing symptom clusters in Fibromyalgia among participants responding to an online survey. The style of writing is clear and logical with appropriate methods. Below are some suggestions for further improvement of the manuscript.

1. On p. 2, lines 17-24 two other studies are cited that detail findings from symptom inventories within the context of fibromyalgia. A statement should be made about how the instruments used in these studies differ from the instrument used in this study and what this study has to offer over the other two.

*We have further described the items in the scales in the background section, noting the lack of emotional/psychosocial items in both prior studies.*

2. On p. 3, lines 8-12 clarify how symptom clustering can explain "whether one symptom leads to or causes another" as this statement would seem to require different types of analyses... or "whether symptom etiology for one or more symptoms is related." It would seem that symptom etiologies are different from the symptoms themselves, and one would need to go beyond the symptom clusters to determine etiologies. This entire sentence from lines 8-12 is confusing and should be restated or deleted.

*This long sentence was broken out into a bulleted list of questions to enhanced comprehension.*

3. On p. 4, provide reference to the protection of human subjects and whether the study was approved by an institutional review board.

*A sentence was added about the IRB approval for the study.*

4. On p. 8, line 9, provide a reference for Cronbach's alpha being acceptable. Most sources recommend alpha be .70 or above. The two factors with alphas of .68 and .66 seem marginal at best. Further elaboration on internal consistency for each of the factors is needed in the discussion.

*We thank the reviewer for this comment. We have now included a reference in the Results section that does state that .70 is considered an "acceptable" Cronbach's alpha. Therefore, three out of our five factors met this criterion.*

5. On p. 8, lines 25-28, provide references for the criteria that allowed the author(s) to indicate "excellent fit" for the CFA based on the data. The fact that the Chi Square was significant seems to indicate that perhaps the fit was not so good. Munro (2005) suggests that relative chi square may be a better indication of model fit (Chi square/df). In this case the relative chi square would be 2.42 (Munro says values of 3, 4, 5, indicate good fit).

There just needs to be a better explanation of how the author(s) interpreted the findings as being an "excellent fit" and providing references for the criteria they used would strengthen the paper.

*We agree with the reviewer that the CFA results were not explained sufficiently. The Munro citation is now included in the Results section. If the proposal model fits the data well, the chi-square should not be significant. In other words, the p-value for the chi-square should be greater than .05. Our results indicated that the model actually did not fit the data well, since the p-value was .000. However CFI and RMSEA results indicated that the observed variable/latent variable relationship and the latent variable relationships had near "excellent" fits with the data. These findings are now presented in the Results section, and are discussed in the Discussion.*

6. On p. 10, line 19, the author(s) state that Factor VII is not really a symptom. Furthermore, the correlations between this factor and the other factors are strikingly lower. The fact that the rating was 4.55 does not seem to be a strong enough rationale for retaining this item in the analysis... nor to include it as a separate single item factor. Some of the other items in Factor IV do not seem to be "symptoms" either... like managing symptoms (not the same as symptoms themselves), provider's ability to manage... etc. It is puzzling why these items were included to begin with. Clarification of the definition of symptoms and why these items are considered to be symptoms to be included in this inventory is needed. Additional background about how these items were developed or chosen as symptoms for this survey could be briefly included in the methods section as well...

*We agree with the reviewer that Factor VII did not assess symptoms. The items in Table 1 were divided into Symptoms/Related Issues. Only the symptoms were selected for the factor analysis in the revised manuscript.*

7. Table 4 could be deleted and the information provided in the text. *Done*

Overall, this is a well-written manuscript, and attention to the above issues could strengthen it further. Symptom clustering is very informative and could provide important clinical implications in this population.

Reviewer #3: STUDY OBJECTIVE: The stated objective of this study was to use factor analysis to determine: whether clusters of symptoms could be identified from among 26 symptoms that participants in an online study reported and to elucidate the underlying structure of this set of symptoms.

LITERATURE REVIEW: The author(s) identify that persons with Fibromyalgia (FM) suffer from a number of symptoms which may go unrelieved for various reasons such as improper diagnosis and lack of effective treatment strategies. Also noted which is key to exploring symptoms is the likelihood of diversity of presentation and etiology. Thus a better understanding is needed. The review briefly without detail identifies several instruments that have been developed and are in testing to measures symptom clusters. An appropriate case is made to study symptoms in cluster in this population drawing from the oncology literature.

On page 2 the researchers define symptom as a subjective evidence of disease or physical disturbance. This is an important conceptual point as later in the article there are two factors with items such as "received support from others" fear of symptoms worsening" "providers ability to manage" and "managing symptoms" do not seem to be conceptually consistent with symptom as defined in the literature.

*This was revised in the current manuscript. Table 1 clearly delineates symptoms from related issues, and the factor analysis now only includes symptoms.*

SAMPLE: Sample for this study was drawn randomly from a larger data base, internet sample. The sample ages ranged from 16 to 78 (Mean of 47.26 and an SD of 10.26.years). As this was an internet survey not all may have been people diagnosed with FM, could be a wide range of respondents. We also don't know if they had co morbidities or length of disease, no extensive identification of who the respondents were beyond gender, age race and education. As this seems to be mainly a report of middle age women what is the impact of menopause on symptoms. Some of this is found in another publication but it would be

helpful to the reader to tables some of the specifics related to disease state of these specific respondents.

*A new table (2) is included in this manuscript to identify some of the co morbid conditions in the sample; unfortunately, menopausal status was not measured in the original study.*

METHODS: Bennett's article is cited as a reference for some of the earlier testing. But this article describes 22 symptoms not 26. How was the decision made to include the extra four items?

*Table 1 was revised to break out symptoms from related issues; only the 20 symptoms were used in the new factor analysis.*

ANALYSIS: Factor analysis is an acceptable methodology to determine the structure of variables sets. I became a little fuzzy as the 7-factor, 6-factor and five factors solutions were briefly discussed on page 7 lines 7-26. An assumption is made that it was used to explore the data for clusters or patterns (stated in abstract).

*To address this issue, we determined the number of factors strictly based upon: (1) the number of factors whose eigenvalues were 1.0 and higher, and (2) examination of the scree plot to determine where the benefit of additional factors levels off. Based upon these analyses using the 20 symptoms, we determined that a 5-factor solution would be used in the analyses. Furthermore, we noted that with the new analysis of 20 items, assignment of item with cross-loadings to > 1 factor was based upon the calculation of Cronbach's alpha for both factors, including the item in question in the analyses. This is now described in the Methods section.*

Question- Is the purpose of this study to further develop an instrument or to identify symptoms and symptom clusters related to the FM disease. It seems as if the intent is to further cluster symptoms and not refine the instrument. But if one wishes to refine clusters of symptoms need to have a good grasp of the makeup of the sample and may not have this in the group.

*The purpose of our study was to identify symptoms and symptom clusters... the addition of the new demographic table should help readers know "who" the symptoms are occurring in.*

Question - A major limitation of the study is that the study does not have some of the main symptoms of FM patients. If the items are based on the literature and focus groups how were these missed? More work is need on these items - definition of what symptoms. The definition of symptoms seems to come from the cancer literature and this literature speaks to symptoms as defined early in this paper but this definition is not adhered to in the items developed. Also how can clusters of symptoms be assessed if core symptoms are missing.

*We are not sure "core" symptoms are missing. Core symptoms in FM are pain, fatigue, sleep problems, and recently, stiffness (Mease et al., 2007; Wolfe et al., 1995).*

The items do cluster together as one would hypothesis. But how are the items from Factor IV and VII symptoms? In the manuscript- page 4 states that content validity was assessed. This was assessed from literature and focus groups. But this was conducted on 22 symptoms not the additional items in Factor IV (Fear of illness) and VII (Perceived support). Page 7 and top 8 make a case for retaining being a burden but is that not tapping into feelings of illness/ quality of life rather than symptoms of disease? Factor VII is not a symptom.

*This has been clarified by the inclusions in the factor analysis of ONLY symptoms.*

Discussion -Page11 line 9- Good point to identify subtypes but how would that be done if do not know other co morbidities, length of disease etc.

*Included in new manuscript*

LIMITATIONS: It seems as if this is a good idea but if one want to see how symptoms cluster must stay true to the definition of symptoms and need to include all cores symptoms.