Reviewer’s report

Title: Regional differences in lumbar spinal posture and the influence of low back pain

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Reviewer: Julie Fritz

Reviewer’s report:

The authors of this manuscript report on lumbar spine position during various tasks or static postures in nursing students with or without LBP, and based on different regions of the spine. The manuscript extends research in this area and may present a contribution to the literature in the area of the relationship between posture and LBP. There are however substantial concerns about the manuscript that should be addressed. My primary concerns relate to two issues. First is the validity of the categorization of subjects into the various LBP categories used in this study. The second is the statistical analysis and the lack of accounting for potential confounding variables in examining the relationship between spinal posture/ROM and LBP category. Details of these concerns are provided below along with additional recommendations. I have referenced the section of the manuscript because my copy did not have any page numbers.

Major Compulsory Revisions

1. Methods section (LBP characteristics) – The categorization of LBP categories requires clarification. In the previous section the authors state that individuals with pain >3/10 on a VAS were excluded, yet lifetime LBP severity >4/10 is one of the requirements for the category “significant LBP”. This appears contradictory. In addition, how is “lifetime LBP severity” determined? The authors mention that this was determined as the “mean episodic LBP severity data”, but it is not clear what this means. How was this question presented to the participant? Were subjects asked to rate the severity of LBP for every episode they have had? If this is the case it raises concerns about recall bias.

2. Statistical Analysis section – The authors do not adjust their between-group comparisons or their correlation coefficients related to ROM and spinal angles for the height and weight (or BMI) or the subjects. The literature recognizes the potential influence of these variables on posture and ROM (for example, Gilleard W, Smith T. Effect of obesity on posture and hip joint moments during a standing task, and trunk forward flexion motion. Int J Obes. 2007;31:267-71) Table 1 does not suggest substantial mean differences between the LBP categories, however individual variation on these variables could confound the results and should be adjusted for.

Minor Essential Revisions

1. The background section is somewhat confusing with respect to use of the term
“posture”. At times the word is used to refer to a static position (sitting, standing), at other times it is used in conjunction with an activity (bending, lifting, twisting) and apparently refers to the position of the spine during these dynamic activities. It would be useful for the authors to clarify their definition of the term “posture” for this manuscript and/or clearly distinguish static posture from dynamic spinal position.

2. Background section (paragraph 3) – The authors refer to “specific health care populations”, but I think what is meant by this phrase is specific health care workers. Health care populations could be confused to types of patients therefore I would recommend changing the “populations” to “workers”.

3. Background section (paragraph 6) – The last sentence of this paragraph attempts to extend the results of a study on the lifting techniques of healthy individuals to identifying an optimal lifting strategy to reduce LBP. I recommend removing this sentence. The credibility of the authors’ supposition is tenuous at best and the issue is not central to the background for the current study.

4. Background section (paragraph 7) – The authors’ conclusions in this paragraph (based on the study by Gill and colleagues), also seem to require some clarification. The authors contend that a lack of variation in lower lumbar posture during lifting in healthy subjects leads to the conclusion that “specific regional spinal postures that an individual holds may be important in the development or maintenance of LBP”. I am not certain how this conclusion is reached based on the results found by Gill et al. Are the authors simply attempting to say that different regions of the spine need to be examined separately? Please clarify.

5. Methods section (LBP characteristics) – Please clarify how subjects with “minor LBP” were differentiated from “No LBP”.

6. Methods section (LLx, ULx, TLx angle measurement) – Please specify the ICC model used to calculate the inter-trial reliability coefficients.

7. Methods section – Can the authors provide any justification for the sample size that was used?

8. Results section (effect of LBP on relationships) – the first sentence of this paragraph is not clear. Consider rewording the sentence to improve the clarity.

9. Results section (effect of LBP on relationships) – The authors state that all subjects were divided into either pain provoked by sitting or no pain in sitting based on the ODI. Were subjects in the “no LBP” category included in this? What threshold on the ODI scoring was used?

10. Results section (effect of LBP on relationships) – The scatter plots are not necessary. These should be removed and the authors should report r values as they have for previous results in the manuscript.

Level of interest: An article of limited interest
Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.