Author's response to reviews

Title: Prevalence of and risk factors for different measures of low back pain among female nursing aides in Taiwanese nursing homes

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Author's response to reviews: see over
Response to editor:
1. This manuscript has been revised by a native English speaking colleague.
2. The study was approved by the Ethical Committee of Hung-Kuang University, and a statement about ethics has also been inserted in the Methods section of the manuscript (page 4, Design and study population, paragraph 2).

Response to the comments from Francesco Violante:

We are thankful to Dr. Violante for reading the manuscript carefully and giving us many valuable comments. Our responses are as follows:

1. Although this is a local study which was conducted in Taiwan, we think the findings in this study could still suggest some implications or be of interest to the readers of BMC Musculoskeletal Disorders. Nursing aides constitute the main workforce in nursing homes and provide direct cares to the aged infirm that have been placed in nursing homes. Work-related low back pain among nursing aides is a common health problem around the world.

2. Dr. Violante comments that the statistical relation between risk factors and chronic LBP and sick leave might be by chance due to the small number of subjects in the two categories of LBP. We state this as a limitation of this study (page 12, Limitations, line 5) and suggest future study to extend the sample size to provide more sound research evidence.

3. Dr. Violante seems to disapprove of the categorical criteria for different measures of LBP in our study because they are related to each other and an individual case might be characterized by more than one LBP related measure. We chose the categorical criteria which were based on consulting many previous studies that used similar criteria [1-4].

Reference
3. Elders LAM, Burdorf A: Interrelations of risk factors and low back pain in


Response to the comments from Lise Hestbaek

We are grateful to Dr. Hestbaek for reading the manuscript carefully and giving us many valuable comments. Our point-by-point response is as follows:

**Major Compulsory Revisions:**

1. The study design of Garg et al. [1] indicated that the magnitude of the applied force per nursing aide (NA) was assumed to be half the patient when a team of two NAs performed the transfer task; they used a biomechanical model to estimate the compressive force on the L5/S1 of the NAs during six patient-transfer tasks including toilet to WC, WC to toilet, WC to bed, chairlift to WC and WC to chairlift (tasks that are similar to those in our study). The study results of Garg [1] demonstrate that even if these six patient-transfer tasks are completed by two NAs, the compressive force on the L5/S1 exceeds 3400 Newtons, which is harmful according to NIOSH standards. According to this finding, if any one transfer task observed in our study was completed by a pair of NAs, we considered this task a risk to the lower back, and the frequency of that particular task was counted as 0.5 for each of the two NAs. This point has been added to the Methods section (page 6).

2. Regarding psychosocial workload assessment in our study, Dr. Hestbaek wondered whether the calculation formulas or reported figures were wrong. After we checked the formulas and figures in Table 2, we found that the reported figures in the first version were correct, but the summed score range of job satisfaction should be corrected to 0 to 100. (It was 10 to 90 in the original version.) Each psychosocial scale in our study yielded a sum, with individual questions weighted according to the calculation formulas proposed by Cheng [2]. The formulas cited by Cheng [2] are as follows:

   (1) $\text{Skill discretion} = (Q1 + Q3 + Q5 + Q7 + Q9 + (5 – Q2)) \times 2$

   (2) $\text{Decision authority} = (Q04 + Q08 + (5 – Q06)) \times 4$

   (3) $\text{Job control} = \text{skill discretion} + \text{decision authority}$
(4) Psychological demands = 3 * (Q10 + Q11) + 2 * (15 – (Q13 + Q14 + Q16))
(5) Supervisor support = Q20 + Q21 + Q22 + Q23
(6) Coworker support = Q24 + Q25 + Q26 + Q27
(7) Work-related social support = supervisor support + coworker support
(8) Job satisfaction = (1 – ((Q30 + Q32 – Q29 – Q31)*3 – (Q28*4) + 40)/60) * 100

According to the above formulas, the score ranges of different subscales may be the same even if the number of questions is different among these subscales. For example, the summed scores of subscales of skill discretion (6 questions), decision authority (3 questions), and psychological demand (5 questions) all range from 12 to 48.

3. The Statistical-analysis section of the first version mistakenly includes the sentence: "The criteria for inclusion and exclusion during ..... were p=0.05 and p=0.10 .........". Because we used multivariate binary logistic regressions with a forward selection procedure to assess the associations between potential risk factors and LBP, we only need inclusion criteria, not exclusion criteria. This wrong sentence may have led Dr. Hestbaek to assume that we first used bivariate logistic regression to choose potential risk factors and then entered them into a multivariate logistic regression. In this version, we corrected the details in the Statistical-analysis section (page 7).

4. In this version, we have complied with the Dr. Hestbaek’s suggestion to omit height from the multivariate logistic regression model. The significant risk factors are the same as in the first version and the new statistical figures are shown in Table 4 (page 20).

5. The sentence in the first version, ".... the study participants were.... lower education level, and older age .........", was also misleading because we had no comparative subjects. So we have corrected this problem in this version (page 8, 1st paragraph: line 5-7).

6. Similar to the explanation on point 3, because we didn’t use bivariate logistic regression to analyze the associations between risk factors and LBP, our descriptions in the discussion section were all based on the findings of multivariate regressions.
7. In this version, we have complied with Dr. Hestbaek’s suggestion to delete some information in the Discussion section that is irrelevant to the study.

**Minor Essential Revisions**
1. We have replaced the term “higher” with “lower” in this version (page 9, Discussion, line 4).

**References**