Author's response to reviews

Title: Leadership, staffing and quality of care in nursing homes

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Author's response to reviews: see over
EFFECTS OF LEADERSHIP AND STAFFING ON QUALITY OF CARE IN NURSING HOMES

The amount of research of leadership and quality of care in nursing homes is limited. We believe that our article provides an interesting description of research in this area. Further, we believe that our study has high quality data. Both the independent and dependent variables are measured thoroughly, the latter by three independent sources: relatives, staff and field observations.

The study shows that leadership and leadership styles are important for quality of care. Hopefully, the study may contribute to an increased focus on leadership behaviour in nursing homes. Further, the study shows that staffing may has a more complex relationship with quality of care than some prior research suggest.

Below you will find the answers to the referees. All changes in the paper are highlighted with coloured text.

Sincerely,

Anders Kvale Havig
Thank you very much for insightful and nuanced comments, questions and proposals for improvements, which to a high degree have helped us in improving our paper. In the following we will – to our best – respond to comments, questions and proposals from the reviewers.

**Answers Referee 1**

1. **Conceptual weakness:**
   The quality of care is a multidimensional construct as noted by authors. However, information gathered from respondents may be too subjective to reveal the actual quality of care rendered by nursing homes. The authors should consider specific aspects of the quality-of-care domains such as the structure-process-outcome aspects of quality. The title of the paper is vague and too general. If only self-reported aspects of care are measured, the study should not be overgeneralized as the quality-of-care study.

   We agree that self-reported data/primary data sources have weaknesses and we have included discussions of self-reported data (Introduction and Discussion). The reason why we have not used secondary data is because Norway does not have any assessment instrument like the MDS. Therefore, we had to use other sources to assess quality of care. To compensate for the lack of secondary data sources, we used three independent primary data sources. In a recent literature review of staffing and quality of care in nursing homes (Spilsbury et al. 2011), the authors found that the majority of the studies had used clinical outcome measures to assess quality of care. The authors specifically encouraged future research to focus on primary data sources to assess quality of care, like relatives and staff.

   We have discussed quality of care more thoroughly (including the three domains structure, process and outcome), see p. 4, 5, 6 and 21 and 22.

   We have changed the title of the manuscript to **LEADERSHIP, STAFFING AND QUALITY OF CARE IN NURSING HOMES**

2. **Leadership Construct:**
   Two highly related aspects of leadership were assessed. A confirmatory factor analysis of one versus two related constructs, task-oriented and relational aspects, could be performed to validate the integrity of the construct(s).

   We have included a factor analysis of the two leadership styles in the Appendix. Furthermore, we have included three new sentences under “Study variables” that explains the factor analysis, see p. 14.

   The factor analysis confirms that there are two separate leadership styles, although the two styles are strongly correlated, as stated in the paper ($r = 0.78$). A high correlation between the two leadership styles is not unusual, however. In leadership theory (Yukl 2010, Bass & Bass 2008, Northouse 2009) there is a strong support for two different leadership styles and the factor analysis confirms that there are two different dimensions of leadership. Thus, we chose to use two different styles.
3. Unit of analysis:
40 wards were included in the analysis. However, these wards were clustered in specific nursing homes. The study may call for an examination of design effect or clustering effect. Multilevel analysis of the data should be considered in order to examine the factors influencing the variation in quality.

We have conducted two-level analyses to account for clustering effect, see p. 16, 17 and 21 and Table 4. The purpose of our study was to study factors at the ward level, however, two-level analyses is appropriate due to the clustering effect.

The use of two level analyses instead of normal regression analyses did not substantially influence the relationships between the three quality outcomes and the explanatory variables, however.

4. Dated literature on the quality of care in nursing homes:
A thorough review of research literature is needed.

We have included a review of the literature of Quality of care, see p. 4, 5 and 6.

5. Tables:
it is necessary to indicate the total number of analysis unit (N=40) analyzed in each table.

We have included “(N = 40)” in every table, see p. 28-30.

6. Limitations of a cross-section study:
The lack of a strong relationship between staffing and self-reported quality indicators observed in this study is because a cross-sectional study was conducted. Notable weaknesses of this design should be noted.

We have included a new section (pp. 21-22) where we discuss limitations and weaknesses in our study. We comment weaknesses with a cross-sectional design as well as weaknesses with the sample and the use of primary data sources/self-reported data.
Answers to Referee 2

1. Study variables, paragraph 3

The two leadership styles were each measured by five items on a scale ranging from 1 to 7, with 1 anchored at strongly disagree and 7 anchored at strongly agree (see 14 Appendix). I could not find this appendix and feel it is crucial to include.

The two leadership styles are presented in Table 2 (see p. 29), and not the Appendix. We have changed the text from “Appendix” to “Table 2” (see p. 14). This was a mistake, thank you!

2. Study variables, paragraph 4

The ratio of registered nurses was measured by dividing the number of full time equivalents of registered nurses (FTE) in permanent positions in the ward by the total number of full time equivalents of care staff. Only registered nurses directly involved with patient care were included. I am not sure what this statement means. Is it the total number of full time registered nurses divided by all full time staff (registered nurses and unlicensed workers)? What about unfilled posts? If so, surely a nursing home with many unfilled posts but an equal number of registered and unlicensed staff will have the same ratio of registered nurses as a nursing home with no unfilled posts and an equal number of registered nurses and unlicensed staff? I think this should be clarified.

We have reworded the sentence, see p. 14. We explicitly state that unfilled posts were included in the total number of care staff.

3. Background

The background in the paper is extremely thorough and well researched but I feel that it may be improved upon if it were slightly more concise. The leadership section feels slightly too long and it may add more impact to your findings if you focus on the studies that are related to task-orientated and relationship-orientated leadership styles specifically rather than several studies on the topic all in the same level of detail.

One challenge with the leadership section is that there have been rather few studies of leadership styles and quality in nursing homes. Therefore, we also included studies that not directly assess the two leadership style. These studies assess similar leadership behaviour and we believe they have interesting results, however. To shorten the section, we have excluded three sentences in paragraph three, see p. 7 in the revised paper (p. 5 in the first paper).
4. Results

*Do you have any graphical representation of your findings? I think it would help to break up the text and hold attention.*

It is not clear to us which results you would like to have presented graphically. From our point of view we find the presentation of results in tables satisfactory.

5. Discussion, paragraph 11

*Physical care level showed a significant negative effect on all the three quality indexes.* For clarity I would suggest that you add that *An increased physical care level showed a significant negative effect on all the three quality indexes*. 

We have reworded the sentence accordingly (see p. 21 in the attached revised paper).

6. Conclusion

*Furthermore, the study shows that nursing homes should minimize the use of unlicensed staff. High ratios of unlicensed staff are, however, often correlated with factors that are unfortunate for quality of care, like low staff stability. Hence, the focus should be on unlicensed staff and its related factors, like staff stability.* Would it be more appropriate to say that nursing homes should aim to minimize the use of unlicensed staff where possible by addressing the underlying reasons for the use of such staff such as low staff stability? The statement seems slightly oversimplified if not.

We have reworded the sentence in accordance with your recommendation, see p. 22 in the attached paper.

Minor issues not for publication, spelling and grammar -

7. Abstract, conclusion

*clarifying of staff’s roles* – change to ‘clarification of staff roles’.

We have reworded the sentence in accordance with your recommendation, see p. 2 in the attached paper.

8. Abstract, conclusion-

I would suggest adding the word ‘address’ before *factors related to high ratios of unlicensed staff, like low staff stability*.

We have reworded the sentence accordingly (see p. 2 in the attached revised paper).
9. Background, paragraph 1-

‘Missing ‘as’ before ‘a key issue for quality of care in nursing homes.’

We have included the word “as” before “a key issue” (see p. 3 in the attached paper).

10. Background. Staffing, paragraph 2

‘For example, Rantz et al. [4] investigated 92 nursing homes in Missouri and did not find any effect for neither staffing levels nor staff mix.’ Grammatical error, double negative, needs to be changed to ‘either’ and ‘or’.

We have changed “neither” and “nor” to “either” and “or” (see p. 10 in the attached paper).

11. Discussion, paragraph 9 -

‘The insignificant relationship (p = 0.09) may be explained by the assumption that licensed staff assessed the quality of care differently from unlicensed staff, the latter group presumably being less critical of their own work than unlicensed staff.’ I think it should be that the latter group (the second group mentioned, eg, the unlicensed staff) were less critical of their own work than the licensed staff.

We have changed the sentence, see p. 21. Thank you!

12. Discussion, paragraph 10 –

‘We should, however, be hesitant to conclude that unlicensed staff has a direct negative effect on quality of care.’ Change to ‘have’.

We have changed the sentence according to your proposal (see p. 21 in the attached paper).

13. Discussion, paragraph 10 –

‘High ratios of unlicensed staff tend to be correlated with other factors that are unfavourable for quality of care, like e. g. low staff stability’ – suggest change to ‘such as’.

We have changed the sentence according to your proposal (see p. 21 in the attached paper).

14. Discussion, paragraph 11 –

‘Physical care level showed a significant negative effect on all the three quality indexes.’ To improve the grammar of the sentence either remove the word ‘the’ or add the word ‘of’ before ‘the three quality indexes.’

We have removed the word “the” from the sentence (see p. 21 in the attached paper).