Author’s response to reviews

Title: Association between registered nurse staffing levels and in-hospital mortality in craniotomy patients using Korean National Health Insurance data

Authors:

Yunmi Kim (kyunm@eulji.ac.kr)
SeYoung Kim (sarakimk@changwon.ac.kr)
Kyounga Lee (tj720221@snu.ac.kr)

Version: 2 Date: 25 Mar 2020

Author’s response to reviews:

Thank you very much for your helpful comments. We have carefully considered them and have done our best to properly address them. The changes are shown in red in the manuscript, and our detailed responses to the comments are presented below.

In addition, we have changed the wording 'number of beds per nurse' to 'bed-to-RN ratio', ‘inpatient mortality’ to ‘in-hospital mortality’ for greater consistency throughout the paper.

Editor Comments

the description of the hospital grading system is very tedious to read though, and might benefit from pruning

-&gt; We have deleted the parts that were deemed unnecessary according to the editor’s comments.

Fiona Nolan (Reviewer 2)

they do not appear to have fully understood the comment from reviewer 1 in relation to the difference between reported staffing levels and actual staffing (head count per day. A hospital staffing level is the desirable level, and perhaps their average per year.
The actual daily staffing is different.
For example a hospital may meet their registered nurse staffing target most of the time, but not all the authors have not taken into account variation in mortality which may occur due to daily, weekly or monthly fluctuations in staffing.
Averages per year may not report these fluctuations. The overall staff and overall mortality are therefore reported.
The authors should comment on this in the discussion section, and as point for future exploration.

-&gt; The RN staffing level was calculated as the mean number of beds over 3 months divided by the mean number of RNs in the ward over the same period. In the discussion section, we indicated that we analyzed the bed-to-RN ratio per quarter, a standard method of classifying the level of nurse staffing in Korea, meaning that actual daily staffing and mortality were not considered. We suggested that studies reflecting the actual daily (per shift or per day) staffing and mortality are also needed.
As an essential correction the title should be revised so as not to mislead readers from the start. Please change to ‘Effects of registered nurse staffing levels…’

We changed the title to ‘Association between registered nurse staffing levels and in-hospital mortality in craniotomy patients using Korean National Health Insurance data’

Also, this second submission continues to lack clarity that registered nurses are the focus of the study, not nursing assistants.

The wording 'nurse staffing' is used in the text eighty eight (88) times before the statement on Page 18, Line 56 'In this study, only the number of registered nurses, not nursing assistants, was analysed'.

Please also move the statement from Page 18 to the end of the background section, prior to the aims section.

We moved this statement to the background and methods section, and changed the wording to “registered nurse” to clarify.

Please replace all 'nurse staffing' wording with 'registered nurse staffing'. The first use of the wording should be 'Registered Nurse (RN) staffing with all references to this phrase to subsequently read RN staffing'.

We replaced “nurse staffing” with “registered nurse staffing.”

Abstract: Line 47- The intensive care of patients requires sufficient staff of all professions, not just nursing. The wording 'craniotomy patient need intensive care after surgery, requiring sufficient nursing staff' should be changed. I would suggest ‘…care after surgery, the majority of which is provided by registered nursing staff’.

We changed the wording from “intensive care after surgery, requiring sufficient nursing staff” to “intensive care after surgery, the majority of which is provided by registered nursing staff”.

Page 2 Line 47: The text 'When a hospital has a lower level of nurse staffing than the demands for nursing' is somewhat clumsy and would benefit from refining. It would also be appropriate to place the statement in the context of patient safety being compromised when the provision of care from both medical staff and registered nursing staff is below the level of need.

We changed the statement according to reviewer’s comment.

‘When the provision of care by registered nurses (RNs) in collaboration with other medical staff and assistants is below the needed level, ~’

Both medical staff and registered nursing staff affect patient safety, but RNs are particularly important because RNs continuously have to monitor and manage their patients.

Page 3 Lines 33-42-
Please delete as these appear to repeat the information in the preceding paragraph.

We deleted the paragraph.

Page 4 Line 10: Delete 'the' before patient mortality rate.

We deleted 'the' before patient mortality rate.
Page 5 Lines 28-29: Insert 'in which' before ICU nurses, and delete 'in caring for craniotomy patients'.
-&gt; We inserted 'in which' before ICU nurses, and deleted 'in caring for craniotomy patients'.

Line 48: insert 'can' before 'now play'.
-&gt; We inserted 'can' before 'now play'.

Page 6
Suggest changing the heading 'purpose' with 'Aim'.
-&gt; We changed the heading from 'Purpose' to 'Aim'

The wording 'present' before 'study is not needed. I would suggest rephrasing to 'the aim of this study was to investigate....mortality, controlling for patient and hospital characteristics using Korean National Health Insurance data'.
-&gt; We rephrased the wording to 'The aim of this study was to investigate the relationships between registered nurse staffing levels (in general wards, ICUs, and hospitals overall) and craniotomy inpatient mortality using Korean National Health Insurance data, controlling for patient and hospital characteristics.'

Line 39: delete 'conducted' as this is superfluous
-&gt; We deleted 'conducted'

Please clarify whether the national data set covered all hospitals in the country
-&gt; This national data set covered all hospitals in Korea. We added this information to the data collection section.

Page 11
Please indicate what proportion of the total hospitals in Korea was represented by the 203 included in the study.
-&gt; We added this information in data collection section. 'This study included 43 out of the total of 43 tertiary hospitals, 153 out of the total of 294 general hospitals, and 7 out of the total of 2,868 other smaller hospitals in Korea.'

Numbers of actual registered nurses per shift and mortality per shift. It would be useful to indicate whether collation of daily actual staffing nurses is possible in Korea through a central data repository.
-&gt; The national data set indicates the mean number of beds and RNs per quarter (each 3 months). In the section dealing with limitations and suggestions, we mentioned that further research is needed on the registered nurse staffing level per day or shift.

Please also include the following as limitations of the study and factors to explore in future research in this area: lack of data around available medical staff and nursing assistant staff per day or per year (and in what way); competency assessments and training provision for registered nurses working in specialist areas or with patients with high levels of need, such as in this study
-&gt; We have included a further discussion of limitations and suggestions in accordance with your comment