Reviewer’s report

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

Version: 0 Date: 06 Dec 2019

Reviewer: Fiona Nolan

Reviewer's report:

This is a nicely written well structured piece of work.

The authors should clarify from the outset that they are referring to registered nurses and also provide information as to whether nursing assistants/auxiliaries are employed on the wards in Korea.

The background section contains statements which encourage the reader to question the justification for this study. If it is known that patients are more likely to die when they have less access to nurses during their hospital stay, why conduct the study? In other words, please give a rationale for looking at craniotomy patients in particular. Also, describe the characteristics of this intervention and associated outcomes that would be useful to consider in others (e.g. those with high infection risk).

If the 2.5 patients per nurse is a legal requirement, please describe what measures are taken when this is not met (i.e. when hospitals break the law). If the meaning is 'mandated' as opposed to a legal requirement, please replace the wording.

Page 3- Lines 35 -50

Please provide brief interpretation of findings to give context and assurance of your correct extraction of the statements - e.g. Any differences in team composition - numbers of nursing auxiliaries, medical staff, and others.

Page 4

Please clarify whether any advanced nursing skills are required to care for this patient group.

Page 7

The presentation of grading systems for hospitals based on nurse staffing is confusing. Are the hospitals in breach of legal requirements when they are graded over 2? Are they required by government to take measures to improve their staffing? Also, please indicate whether the grading of hospitals is within the public domain, and if so, are they likely to cause concern to the patients receiving treatment within them?

Page 9

Lines 32-35: Changing wording throughout from 'hospital' to medical institution' is confusing. Please use the same term throughout the paper.
Page 10
Lines 2-9: This isn't clear I'm afraid - can you reword?

Page 11
Line 32: please insert full wording for CCs on first use

Page 12
Line 43:
The following sentence should be explained 'other variables, in addition to the level of nurse staffing, were found to show certain tendencies in all three models in terms of their effects on inpatient mortality after craniotomy."
These other variables are important. 'Certain tendencies' is a strange description - they are either significant or not. Please indicate which, and also where nurse staffing ranks in relation to impact on morality, compared to, for example, numbers of doctors.

Page 15
Line 35: please indicate whether the assertion that nursing numbers are reduced to cut costs is profession-specific i.e. nursing numbers are reduced in preference to doctors' numbers

Page 16:
Lines 2-13: Please clarify that these examples are for registered nurses working with clinical teams, and demonstrate that you are aware of the composition of these teams (e.g. nursing assistants, medical assistants, advanced practitioners and allied health professionals). This is necessary to assure the reader that you are aware that patient care is delivered by a team.
The use of the examples within a Korean context can then be explored for relevance.

Lines 24-27 What is medical law? Does it mean 'the legal framework within which healthcare is provided in Korea' for example? Reference to the specific acts of government passing the laws would be needed.

Line 50: Please explain the difference between the number of beds and number of patients.

Finally the findings in relation to the importance of other variables on mortality of this patient group, in addition to nurse staffing, are very important to present clearly and without ambiguity. A robust review of the regression analysis and modelling is needed.

The description of what this study adds to existing knowledge is weak. The authors should come back to the question about 'why craniotomy?'

Access to this large dataset is unusual and could be highlighted by the authors in terms of potential benefits, as most countries do not have a central repository such as this.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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Please indicate the quality of language in the manuscript:

Acceptable

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