Reviewer’s report

Title: Epidemiology and outcomes of people with dementia, delirium and unspecified cognitive impairment in the general hospital: prospective cohort study of 10,014 admissions.

Version: 0 Date: 22 Feb 2017

Reviewer: Giuseppe Bellelli

Reviewer's report:

Cognitive disorders, including dementia, delirium and delirium superimposed on dementia are important topics due to their current and future prevalence among older people and the poor functional, cognitive, and vital prognosis related. In hospitals, studies assessing CSD are lacking. So, the current study is particularly relevant in its field. The number of individuals assessed is huge which makes these findings particularly important. Moreover, the study advances over previous ones undertaken and provides information useful for physician's clinical practice. However, I have some concerns and queries for authors:

1. Despite many people underwent a comprehensive geriatric assessment, the study does not report data regarding the individual's health, nutritional and functional status. This would be important not only to obtain a more detailed picture of patient's clinical characteristics, but also to make additional statistical analyses (for example by adjusting the association between CSD and both readmission and mortality). In fact, it might be possible that some of the effect of delirium, dementia and delirium superimposed on dementia on mortality can be mediated by these factors. Such additional analyses are not intended to lower the importance of this association, but, rather, they might contribute to further strengthen the study findings.

2. I admit to have some difficulties in understanding what does the term "unspecified cognitive impairment" mean. By reading the authors' definition in the introduction section, it looks like that this spectrum of disorders includes a variety of symptoms and conditions, which are more typical of delirium (and of delirium superimposed on dementia). In what "unspecified cognitive impairments" are different from delirium and/or dementia? Furthermore, it's unclear whether these disorders are "unspecified" because it's not possible to obtain patient's specific information or because researchers are not able to reach a consensus on the diagnosis. I think that the authors should provide an additional effort to better characterize what this condition actually is.

3. Some of the studies used by the authors to support the rationale of their study are outdated and may create misunderstanding. For example, in the introduction section (page 7, lines 1-3), the authors state that studies about the associations between delirium superimposed on dementia and mortality and readmission are conflicting. To support their assertion, they
cited the study by Fick et al, 2005 (ref 9). However, there are several subsequent studies that have clearly demonstrated that DSD is strongly associated with higher mortality rates compared with patients with dementia alone or nor delirium neither dementia (see for example J Gerontol A Biol Sci Med Sci. 2007;62(;1306-9; J Am Med Dir Assoc. 2014;15:349-54). These and other studies should be considered.

4. It's unclear to me how did the specialist nurses provide certain diagnoses of delirium. How is it possible that patients may have been diagnosed with delirium in the absence of a positive score on the CAM? Who are these patients? Please explain. In addition to this point, it should be explained the apparent disproportion in table 1 between the prevalence of patients with CAM + delirium (which is 7.6%) and those with clinical history suggestive of delirium (which is 17.0%). Do these findings suggest that specialist nurses relied more on their clinical sensitivity than on the screening tool reliability when diagnosing delirium?

5. I think that the authors should provide readers with some information regarding the methods they have used to ensure that all specialist nurses had an equivalent level of competence in diagnosing cognitive disorders.

6. The authors should acknowledge that the study has been carried out in a single hospital, which means that their data cannot be immediately generalized to other settings.

Minor issues:

1. I think it should be appropriate to add a sentence (in the introduction section) stating that delirium and delirium superimposed on dementia are costly as well as dementia alone.

2. Introduction section: page 6, lines 44-51. This sentence is unclear. To what dementia review did the authors refer? The study with reference 12 is outdated and should be replaced with more recent studies.

3. The study cited in reference 8 is not a review on dementia and the study cited in reference 3 is not a study on delirium.

4. I did not find the table 2.

5. It's not fully clear what is the difference between table 3 and table 4. Why do not analyze separately the readmission or death prevalence by 30 days and by one year?
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?
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