Reviewer's report

Title: Relative and absolute functional gain and rehabilitation efficiency index: Three different measures of physical rehabilitation effectiveness in elderly patients: a prospective longitudinal study

Version: 1 Date: 9 July 2015

Reviewer: Catherine Said

Reviewer's report:

This is an interesting paper that compares three different measures of rehab efficiency in older inpatients. Overall the paper is well written. The authors consider the relative merits of each of the indices.

Major Compulsory Revisions.
1. A discussion on the limitations/merits of the Barthel Index itself should be included, and how this impacts on the various RII. For example, the Barthel is not an interval scale (eg BI Adm of 0 to BI D/C 20 and BI ADM of 80 to BI D/C of 100 will both give a change of 20, but this does not mean the magnitude of change is the same. This may impact on the calculation of each of these efficiency scores. It is also important to know whether the Barthel demonstrated a ceiling effect; how many people scored the maximum score on discharge. You do note this as an issue with the AFG, but as it is an issue with the measure itself it will impact on the other RII as well. Another issue that should be considered is whether the changes in Barthel are larger than the Minimal Detectable Change (ie the change is a true change and not due to measurement error) and the Minimal Clinically important Difference (i.e a change that is clinically important). I think this is particularly relevant when you talk about an RFG > 35% as being indicative of clinically effective rehabilitation. In some cases, it is possible that the observed change may not be greater than the MCID. The authors should include a comment on this in their discussion.

2. The authors should also clarify whether ethics approval was granted for this study. They should also confirm patient flow thru the study- it appears that 753 patients were admitted, 68 excluded leaving 685 eligible participants, all of whom consented……. Is this correct? Was consent verbal or written?

3. In the results section it would be useful to have the median Barthel / Pfeiffer test scores at Adm and D/C (as well as breakdown into categories). Over 1 in 5 people are in the 0-20 Barthel category which seems very low.

Minor Essential Revisions
4. Abstract: Line 14: reword to reflect that the mean LOS was around two weeks (rather than it being a two week time limited program).

5. Abstract Conclusion: not clear what RII means.
6. Introduction Pg 4 ‘Therefore, RIIIs that are calculated at the start of the rehabilitation….’ I am not clear how an RII can be calculated at the start of rehab- can only be done once the person is discharged.

7. Pg 5. Please clarify who completed Barthel Index on Adm and D/C. Within what timeframe of admission/ discharge was it completed

8. Pg 8 line 183 ‘lower score in BI Adm’- from Table 4 those with the lowest score had smaller changes than this with moderate scores (21-60). Which groups were the differences between?

9. Any reason why the multivariate analysis was only done for RFG?

10. Line 246 ‘Because of this same effect, patients that achieved complete recovery (RFG = 100%) had low AFG values (Table 3) …’ This is not correct (and you contradict this statement in the next sentence) According to Table 3 people with an RFG of 1005 had an AFB of 34.5, which was similar to those in Group III.

11. Line 268 It would be useful to report Mean Adm Barthel (as indicated above) for this discussion- is the Admission Barthel comparable to other studies

Discretionary Revisions

12. There are a lot of tables; can any be condensed? (eg can table 1 and 2 be combined and some info in Table 2 put into text)

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
'I declare that I have no competing interests’