Reviewer’s report

Title: Appropriateness of acute admission and in-patient stay for patients with long term neurological conditions

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Reviewer: Andrew Worthington

Reviewer’s report:

This is an interesting study purporting to examine prevalence of, and factors associated with, hospital admission for long-term neurological conditions. While the paper is worthy of consideration, and I’d like to see the study published at some stage, in its current form it is not acceptable for publication. There are some methodological weaknesses and significant textual amendments which require attention before it can be considered worthy of publication but I would strongly urge the authors to consider these revision.

Major compulsory revisions

An expert panel is acceptable in this context, but the definitions they worked with are not. The authors state that the appropriateness of both hospital admission and length of stay are determined by whether or not the level of care required could only be provided in hospital. This is fine so long as you first establish appropriateness of admission, and then (for those admissions which are appropriate ONLY) you can look at whether their LoS was also appropriate. However, if admission is inappropriate, ie. patient care could be provided by another means, then I fail to see how one can decide that a subsequent episode of care in hospital can be judged appropriate in duration. The two are not independent. The authors need to conduct their analysis first in terms of admission, and then LoS, but only for those with appropriate admission. The authors acknowledge that 32 cases were considered not to require acute care, and they recognise that these cases could be considered on this basis alone to have inappropriate LoS. It’s no good then saying "however the panel sought to determine for these cases whether or not participants’ needs were met and if the participant was discharged without delay following this” because according to the definition of LoS the authors say they used, it’s not a question of whether needs could be met in hospital but whether they could be met equally well elsewhere. Therefore appropriateness of LoS is related to availability of alternative care options, not to how well patients are managed in hospital. According to their own definition even if patients are well managed in hospital, this is irrelevant if the care could be provided elsewhere. The authors have got in a muddle because the definition they use does not support their contention that appropriateness of admission and of LoS are independent.

In terms of factors associated with inappropriate admission, it’s claimed that living in their own home or a residential/nursing home was associated with
inappropriate admission - well it can’t be both. In fact, as they later acknowledge table 8 shows living in a Home is associated with fewer inappropriate admissions (22 vs 8) whereas living in one's own home is not (20 vs 10). However if 30 participants lived in their own home and 25 in a residential or nursing home where do the other patients live? Even if receiving a home help is considered a separate category, this is still only 90 patients, where are the others?

Figures in table 7 are also confusing. First the figures for epilepsy in the LoS appropriate column seem to be the wrong way round, 29(81) should be 81(29) I think. Adding up the column totals, there are 41/148 inappropriate admissions (28%)

and 96/213 (45%) inappropriate LoS. Leaving aside my contention that some of these inappropriate LoS patients shouldn't be counted as they were also admitted inappropriately, it’s not clear where the authors get their figure from that LoS was inappropriate in 2/3 cases, as they state in the discussion.

Minor essential revisions

Despite the details given in the paper, it is not clear how the patient sample was selected. It seems as if two physicians were required (1 to diagnose, another - a rehab physican -to determine chronicity). There is no mention of consent procedures; where did the 119 patients come from - successive admissions?

It was not clear to me intially whether the expert panel was required to reach a consensus on appropriateness for each case, but it seems not from the subsequent analysis of inter-rater concordance. It's not entirely clear exactly what information the panel have available when making their judgments, as some appear to be made in retrospect, and this kind of hindsight may affect the panel decisions.

The sample size was calculated from acute stroke data (non-UK) but stroke outcomes vary widely internationally and therefore are not comparable, nor is it clear that acute stroke is the appropriate comparison group given the study is about long-term disability. It's not clear how the confidence interval is derived or why the final sample size was less than half the size needed for the study hypotheses.

Judgments of appropriateness of admission were made on medical grounds alone, yet the authors' definition of what is appropriate allows for a broader interpretation and is based on care needs. Disability associated with chronic illness is predicted more by psychological mechanisms than the disease process itself. It's not clear from this if someone who has psychological needs and isn't coping well with a chronic illness would be considered appropriate or not - I note there is no psychologist on the extended panel, nor any reference to how psychological needs were to be taken into account in establishing needs.

Overall therefore, there is significant work to be undertaken to tidy up this paper and correct some methodological errors before it can be published.
The authors should first look at admissions, and at least acknowledge psychological precipitants to admission - ie. does an admission on the grounds of poor coping count as appropriate or inappropriate on medical grounds.

They should then consider LoS only for appropriate admissions, and they should distinguish between a technical delay in discharge (ie a day or more) from a more realistic target, at least by providing a range in days (median etc) for inappropriate LoS.

They should simplify their statistical analysis, recalculating power based on their sample size. There are too many analyses on too many patients.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests