PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (http://bmjopen.bmj.com/site/about/resources/checklist.pdf) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

<table>
<thead>
<tr>
<th>TITLE (PROVISIONAL)</th>
<th>From QASC to QASCIP: Successful Australian translational scale-up and spread of a proven intervention in acute stroke using a prospective pre-test/post-test study design</th>
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<tr>
<td>AUTHORS</td>
<td>Middleton, Sandy; Lydtin, Anna; Comerford, Daniel; Cadilhac, Dominique; McElduff, Patrick; Dale, Simeon; Hill, Kelvin; Longworth, Mark; Ward, Jeanette; Cheung, Wah; D'Este, Catherine</td>
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VERSION 1 - REVIEW

<table>
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<tr>
<th>REVIEWER</th>
<th>Peter Langhorne</th>
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<tr>
<td>UNIVERSITY</td>
<td>University of Glasgow, UK</td>
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<tr>
<td>REVIEW RETURNED</td>
<td>16-Oct-2015</td>
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GENERAL COMMENTS

Comments to the authors

I read this article with interest as it addresses the important topic of implementing high quality care for acute stroke patients. The study appears ambitious and, within the limitations of the study area, carried out to a high standard. I have several questions and comments as follows.

1) Title – I find the title confusing because you imply that the intervention has decreased death and dependency but these results do not refer to this paper.

2) Methods – Retrospective Audit – This audit appears to have been potentially unblinded in that the audit staff could be aware of the nature of the study. Please can you clarify? In particular you state that “the NSF provided the researchers with previously collected data.” Was this information independent of the study?

3) Methods - Post intervention audit – Interrater reliability was recorded in the second phase of the audit. Can you please comment on whether this data set is likely to be more high quality and reliable than the routinely collected audit?

4) Data analysis – I would welcome the advice of an independent statistician.

5) Results – Lack of difference between hospitals with and without a stroke unit. Was there any suggestion of a “ceiling” effect?

6) Results – Please can you comment on the differing results between rural and urban centres?

7) Discussion – Clinical Outcomes – Is there any prospect of linking to routine outcome data? I think this would greatly strengthen your paper.

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<th>REVIEWER</th>
<th>M. Fernanda Bellolio</th>
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<tr>
<td>UNIVERSITY</td>
<td>Mayo Clinic, USA.</td>
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<td>REVIEW RETURNED</td>
<td>13-Nov-2015</td>
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This study is a nurse-led multicenter quality improvement investigation that aimed to evaluate how well a quality intervention, to improve and standardize stroke care, embedded into stroke services in New South Wales, Australia.

The authors defined the study as a clinical translational initiative of a Quality in Acute Stroke Care Implementation Project (QASCIP), targeted to stroke services.

They trained clinical champions in the local hospitals and audited medical records to assess clinical and laboratory measures of stroke management before and after the QASCIP intervention.

The authors found an improvement in the management of fever, hyperglycaemia and swallowing in these patients.

Authors conclusion is that there was state-wide scale-up and spread of a nurse-led intervention for patients with stroke, and describe the initiative as replicable and feasible in other acute care settings.

In the abstract
Conclusion of the abstract could be misleading as currently worded “We obtained unprecedented state-wide scale-up and spread to all NSW stroke services of a nurse-led intervention proven to improve long-term patient outcomes.”
I suggest that the authors state the finding of their research.
Attention to fever and glycaemia in stroke patients have been proven to affect mortality and disability outcomes in previous studies, however this study did not look at a clinical outcome, it only look at the interventions. So please edit accordingly.
I recommend you use the wording of the conclusion of the paper to improve the abstract.

In the methods
Some good methodological practices from the authors are 1) the calculation of inter-rater reliability for the variables collected; 2) there is clear explanation of the practices used (ie: personal invitation letters to stroke services directors, coordinators, unit management, etc.) as well as instruments used; 3) data analysis included clinically important variables; 4) missing data was managed as negative, and this is an appropriate conservative approach; and 5) authors followed standardized guidelines for quality improvement ad audit studies.

In the results
Most of the results are descriptive percentages between pre and post implementation with it associated p-value. There are few odds ratios created through log model and appear with the appropriate confidence intervals.
The paragraph of Pre-QASCIP and post-QASCIP audit results only has p-values. Please add the magnitude of the difference to allow the reader to criticise the statistical and clinical significance of your findings.
Again in page 18 there are only p-values. Please add the magnitude of the differences, even if not statistically significant.
Table 5 reports that significant p-values are in bold. I did not see them bolded.

In the discussion
Good discussion regarding why the results were/were not significant. There is low adherence to the protocol. Sometimes making protocols simpler and empowering the patient and family help with this initiatives, example: letting the family know that patients should be treated for fever and glucose should be checked 3 times a day. The conclusion is adequate and based on the results of the study.

In summary this is a quality improvement study and it is patient-centred, as it looks for better ischemic stroke care in patients admitted to the stroke services across the region. It does not look into direct patient outcomes. It is performed in real world setting and we can see how protocols translate to clinical practice not only in academic or urban setting, but also rural areas.

Next step is to see if the intervention “sticks” and the improvements noted remain over time.

VERSION 1 – AUTHOR RESPONSE

Reviewer #1

1. Title - I find the title confusing because you imply that the intervention has decreased death and dependency but these results do not refer to this paper.

We now have altered our title to clarify this. Our new title is:

From QASC to QASCIP: Successful Australian translational scale-up and spread of a proven intervention in acute stroke using a prospective pre-test/post-test study design

2. Methods – Retrospective audit – this audit appears to have been potentially unblinded in that the audit staff could be aware of the nature of the study. Please can you clarify? In particular you state that “the NSF provided the researchers with previously collected data.” Was this information independent of the study?

The pre-implementation data were collected and submitted to the NSF independently of our study and before the study was conceived. Staff could not have been aware of the study at the time of baseline audit. We have clarified this in the manuscript as follows on page 8 (new wording underlined below):

“To establish pre-QASCIP practice, following consent from stroke services, the National Stroke Foundation (NSF) provided the researchers with self-reported data previously collected independently of our study as part of the NSF National Clinical Audit (using patient data for stroke admissions between 1 July 2012 to 31 December 2012)[29] and the NSF Organisational survey (data collected 1 April to 31 May 2013).[30] Using the established NSF audit web-based tool,[28] clinical champions had conducted this retrospective audit of the records for the first 40 consecutive patients with a primary diagnosis of stroke admitted to the stroke unit between 1 July 2012 to 31 December 2012, excluding patients with subarachnoid haemorrhage, subdural and extradural haematomata, transient ischaemic attacks, and those patients deemed to be for palliation only. Any sites which had not participated in either of these previous NSF audits provided self-reported retrospective pre-intervention data directly to the researchers using the NSF web-based audit tool in an identical manner and time period.’

And on page 9 in the instrument section as follows (new wording underlined below):
For both the pre and post-implementation audit, we used 19 existing relevant items from the 2013 NSF Clinical Audit as follows: …

The post-implementation data, again self-reported, were prospectively collected specifically for our study and this has been clarified on page 9 as follows (new wording underlined below):

‘Participating sites also were required to conduct a self-reported prospective audit …’

We also have clarified this in the abstract as follows (new wording underlined below):

‘… patient data from retrospective medical record self-reported audits for 40 consecutive stroke patients per site pre-QASCIP (1 July 2012-31 December 2012) were compared with prospective self-reported data from …’

3. Methods - Post intervention audit – Interrater reliability was recorded in the second phase of the audit. Can you please comment on whether this data set is likely to be more high quality and reliable than the routinely collected audit?

We used identical methods and processes to collect our post-implementation audit data to those routinely used in the NSF audit (as stated on Page 9 of the manuscript). Because pre-implementation audit data were obtained by the National Stroke Foundation before our study, inter-rater reliability was not determined. As post-implementation data were collected after QASCIP, greater confidence could be afforded data with high inter-rater reliability.

4. Data analysis – I would welcome the advice of an independent statistician.

We have two experienced statisticians who are authors on the paper. One is a full professor in biostatistics with decades of experience and publication track record in statistical aspects of complex trials. Should an independent statistician be considered necessary by the Editor, we would welcome additional review.

5. Results – Lack of difference between hospitals with and without a stroke unit. Was there any suggestion of a “ceiling” effect?

The outcome with the highest pre-implementation adherence was monitoring for fever, ranging from 59% to 85% across levels of the five factors of interest regarding determining associations. Given this, we believe that there is minimal evidence of a ceiling effect, as these pre-implementation and between factor values still allow potential for substantial pre-post improvement. In particular pre-implementation monitoring for fever was 59% and 78% for hospitals with and without dedicated stroke units, respectively, which do not constitute a ceiling effect.

6. Results – Please can you comment on the differing results between rural and urban centres?

Reasons for this are purely speculative. We now have added in the following sentence on page 21:

‘but further exploration of this difference was beyond the scope of our study.’
7. Discussion – Clinical Outcomes – Is there any prospect of linking to routine outcome data? I think this would greatly strengthen your paper.

While the Australian Stroke Clinical Registry (AuSCR) collects outcome data, these are collected between 90 and 180 days and do not include the modified Rankin Score which was the primary outcome collected at 90-days in the original QASC trial. In implementing QASCIP to determine how effectively our original intervention could be replicated and scaled up, we were able to report meaningful outcomes but unfortunately not the modified Rankin scores for patients at 90 days. Nonetheless, we knew that behavior change if achieved in QASCIP, would lead to improved outcomes because of the strength of the randomized controlled trial evidence linking specific practice to specific outcomes from the QASC trial. This rationale underpins almost all clinical practice in which treatments proven to work in rigorous trials with convincing endpoints can be adopted in routine practice. Furthermore, QASCIP was constrained by tight timelines required by the government funding body.

Reviewer #2:

8. Conclusion of the abstract could be misleading as currently worded “We obtained unprecedented state-wide scale-up and spread to all NSW stroke services of a nurse-led intervention proven to improve long-term patient outcomes.” I suggest that the authors state the finding of their research. Attention to fever and glycaemia in stroke patients have been proven to affect mortality and disability outcomes in previous studies, however this study did not look at a clinical outcome, it only look at the interventions. So please edit accordingly.

I recommend you use the wording of the conclusion of the paper to improve the abstract.

We have now added the word ‘previously’ to our abstract conclusion to avoid any confusion.

9. In the results - most of the results are descriptive percentages between pre and post implementation with it associated p-value. There are few odds ratios created through log model and appear with the appropriate confidence intervals. The paragraph of Pre-QASCIP and post-QASCIP audit results only has p-values. Please add the magnitude of the difference to allow the reader to criticise the statistical and clinical significance of your findings.

95% confidence intervals now are shown.

10. Again in page 18 there are only p-values. Please add the magnitude of the differences, even if not statistically significant.

95% confidence intervals now are shown.

11. Table 5 reports that significant p-values are in bold. I did not see them bolded.

This now has been corrected.