

Stroke care in Pusat Perubatan UKM; the actual picture

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We refer to the article by NA Mohd Nordin *et al*¹ which focuses on the cost of stroke-related hospitalisation. We congratulate the authors for highlighting an important topic, however some points merit re-examination.

The authors state that stroke patients with prolonged stay due to 'other conditions not related to stroke' were excluded from the analysis. Yet there is no mention of what these conditions are, when they should rightly be stated clearly in the exclusion criteria. The worsening of co-morbid conditions or onset of new related complications often occurs during a stroke admission, and many clinicians will attest that this is directly related to the underlying stroke or related treatment. This results in increased morbidity and mortality². Excluding these patients would unnaturally limit the sample size and reduce the mean length of stay (LOS).

There were 903 stroke patients identified in the Casemix database from 2005 until 2008. Of this number, 453 patients were classified as ischaemic stroke. For a similar period, we in the Neurology unit recorded 613 ischaemic stroke patients on the PPUKM Stroke registry. Aside from this discrepancy, we are also puzzled by the large number of strokes that are classified as 'unspecified'. Whether the apparent weakness of the Casemix as a primary data source is due to poor data entry or an inherent weakness of the system itself is for the authors to explain.

The severity of stroke was understandably linked to a significant increase in LOS and hospitalisation cost. However, the authors do not state what measure or tool was used in determining the severity of stroke. This is again surprising as it appears to be an important outcome measure of their analysis.

We would also like to clarify certain points stated in the article.

The authors have mentioned the existence of a clinical pathway used in determining the suitability of patients for discharge. We would like to categorically state that no such document exists that is used by the Neurology Unit, and that a patient is considered fit for discharge based on the judgment of the stroke team, which includes the occupational and physio-therapists.

The authors claim that PPUKM does not have an acute stroke unit. We beg to differ. The PPUKM acute mobile stroke unit³ has been operational since 1999. What we do not have in PPUKM is a dedicated stroke ward. If this is what the authors

are referring to, we must urge that they familiarize themselves with the correct terminology used for their future reference.

The estimation of treatment/hospitalisation cost is an important aspect of healthcare as it allows proper utilisation of limited resources. However, to prevent the dissemination of incorrect assumptions, an analysis of these estimations must include input from all major stakeholders.

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Reply:

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We thank Ramesh Sahathevan et.al. for their interest in our paper. However, we would like to answer their criticisms.

We are aware that length of stay is an important variable in estimating costs related to hospitalisations and by excluding some stroke patients from the list would reduce the mean LOS thus results in lower costs of care value. Although in costing analysis, there is a need for data trimming to obtain a more normally distributed data, exclusion of stroke patients from the list were carefully made and only involve patients who were considered outliers, which would contaminate the data. These include stroke patients with extremely prolonged hospitalisation due to management of co-morbidities not commonly due to stroke such as chronic renal failure,

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unexplained fever, chronic obstructive airway diseases and severe arthritis. Although we did not state the number of stroke patients who were excluded due to these conditions, the number of excluded patients including patients diagnosed with TIA were only 10% of the total stroke patients. We believe that this small percentage has not significantly affected the mean LOS. The mean LOS in our study (i.e. 6.48 days) is rather comparable with that reported in a previous study involving stroke patients who were admitted to PPUKM in the year 2001 i.e. 7.48 days¹.

Patients' data in the Casemix system originates from the individual patient's medical record. All data are entered by a dedicated PPUKM staff who received specific clinical coding training prior to data entry. Because the Casemix data is dependent on the clinician's documentation in the patients' medical record, any accuracies or errors in the Casemix database are due to the strengths or weaknesses of the medical record documentation by clinicians at PPUKM. We are pleased that PPUKM has now maintained a stroke registry. We urge that the registry should be made more accessible to PPUKM's researchers and data in the registry should be published as soon as possible to serve as reference to future stroke studies.

Casemix unit uses United Nations University-Case Based Grouper (UNU-CBG) which was customised into the Malaysian Diagnosis-Related Groups (MY-DRG) disease classification system (2). In categorising clinical cases into a mild, moderate or severe disease category, the system reviews both the primary and secondary diagnosis of a patient, and the main and additional healthcare procedures utilised during hospitalisation. Disease severity level was also determined by the presence of comorbidities and complications; cases with comorbidities and complications which statistically significantly result in an extension of length of stay are coded as moderately severe or severe based on specific statistical values. UNU-CBG/My-DRG is an internationally recognised method of disease severity classification in health economic field.

Concerning the clinical pathway, we wish to stress that information about the pathway and its content was obtained from clinicians who have worked in the medical wards during the period the study had covered. The development of the pathway for acute stroke care was championed by two neurologists who led stroke care at PPUKM during the previous years. Several disciplines were involved in developing the pathway, including physiotherapy. The pathway serves as a reference document for the medical ward staffs who manage stroke patients including therapists. We were informed by the stroke care team of PPUKM that the clinical pathway is currently being revised to include post-acute and long term care components.

With regard to the claim that PPUKM has a stroke unit since the year 1999, we disagree. We believe that our understanding of stroke unit definition and characteristics is correct. We have referred to a comprehensive guideline for implementation of a stroke unit care by The Canadian Stroke Strategy (CSS)³. The CSS reviewed high quality evidences including evidences from the Cochrane Collaborations database and The Stroke Unit Trialists' papers in developing their guidelines. Three types of stroke unit model are reported i.e. 'acute stroke unit', 'integrated stroke unit' and 'stroke rehabilitation unit'. Regardless of the model, the following main elements are considered minimum criteria for a stroke unit:

- dedicated geographically defined units
- interprofessional staffing - team that consists of physicians, nursing and therapy staff (physiotherapy, occupational therapy, speech therapy, social work);
- co-ordinated multidisciplinary rehabilitation services
- staff with a specialized interest in stroke or rehabilitation;
- team meetings held at least once per week
- routine involvement of carers in the rehabilitation process;
- regular programmes of staff education and training

During the period that our study covered, PPUKM has no established facilities that can be regarded as a 'stroke unit' based on the above mentioned criteria. However, we are pleased to know that PPUKM has taken measures to establish the long waited stroke unit. We were recently briefed by the stroke care team at PPUKM that the stroke unit is now in its final stage of construction and will be operational soon this year.

Concerning the existence of 'acute mobile stroke unit' as claimed by the authors, we urge that the term 'mobile stroke unit' should be used with caution to avoid dissemination of incorrect information to the public. We suggest the authors to refer to a paper by Fassbender *et al.*⁴ titled 'Mobile Stroke Unit for Hyperacute Stroke Treatment' published in 'Stroke' for full description of a mobile stroke unit.

We believe that our estimation of stroke admission cost is correct based on the available stroke data for the period that our study covered (i.e. 2003 to 2008).

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