Institution: University of Nottingham

Unit of Assessment: UoA4 - Psychology, Psychiatry and Neuroscience

Title of case study: Influence of stroke rehabilitation practice and assessment methods on national and international clinical guidelines

1. Summary of the impact

Research at Nottingham, reviewing and evaluating best practice for care of stroke patients since 1993, has influenced clinical practice by contributing to key national clinical guidelines. Additionally, research at Nottingham has developed and validated existing stroke assessments with new publications encouraging the uptake of these assessments globally in Europe, North America, China and Japan. Finally, Nottingham researchers have achieved impact within the stroke community by working directly with patients to develop care pathways and building networks of clinicians, occupational psychologists, clinical psychologists and patients to ensure research translates effectively into real-world practice.

2. Underpinning research

Since 2000, Prof. Nadina Lincoln has conducted research at the University of Nottingham with the broad theme of both developing and assessing the validity of assessment methods and determining the effectiveness of stroke rehabilitation methods, interventions and assessments including:

1. A series of Cochrane Systematic Reviews to summarise the evidence for cognitive rehabilitation for attention, memory and spatial neglect following stroke
2. Development and validity testing of stroke assessments for international use (for depression and screening for driving ability)
3. Development of clinical trials to evaluate behavioural interventions for stroke patients including those with low mood

All these have important and ongoing impacts both in the UK and internationally on practice guidance, clinical practice and the re-development of assessment methods

1. Cochrane Systematic Review Library

From 2007 onwards, Lincoln and colleagues conducted systematic reviews examining the effect of cognitive rehabilitation on memory[1], spatial neglect[2] and attention[3] following stroke, some of which have recently been updated. One review evaluating cognitive rehabilitation for memory problems after stroke[1], found insufficient evidence for its routine use in clinical practice. Another examining the persisting effects of cognitive rehabilitation on spatial neglect[2], as measured by disability level and hospital discharge, concluded the evidence supporting its use in standard clinical practice was inadequate. These reviews highlighted the weak evidence upon which practice of care for stroke patients was based and informed a series of recommendations in the fourth edition National Clinical Guideline for Stroke by the Royal College of Physicians (2012).

2. Assessment and Questionnaire Development

Lincoln and colleagues identified a need for suitable measures to evaluate psychological outcomes following stroke. In 2000 they developed and validated the Stroke Aphasic Depression Questionnaire (SADQ) and in 2006 showed that it is a reliable and sensitive means of assessing mood in stroke patients with communications difficulties[4]. The SADQ has both community and hospital versions and French, Dutch, Greek, Italian, Japanese and Chinese translations. In 2012, Kneebone (University of Surrey) and Lincoln[5] highlighted the gap between the identification and management of anxiety and depression in those with cognitive and mood disorders following stroke, resulting in an NHS improvement plan to tackle these issues (section 4). Lincoln and colleagues also developed the Nottingham Sensory Assessment test to measure somatosensory impairment after stroke[6]. The test was developed in conjunction with a European study examining the differences in rehabilitation practice in four European centres. In addition to better assessment of mood and sensory problems, they also went on to develop assessment pathways in relation to cognitive screening and the assessment of fitness to drive. As part of this, the Stroke Drivers Screening Assessment (SDSA) was revised, and based on research evidence from other centres,

the SDSA has been adapted for use in the USA, Europe, Japan and Australia.

3. Evaluation of Clinical Trials for Depression

An important strand of Lincoln's research, arising from identification of the state of knowledge regarding psychological problems after stroke[5], is the evaluation of psychological aspects of rehabilitation, especially the treatment of cognitive deficits and low mood. In 2008 Lincoln and colleagues identified aphasia as a key risk factor for the onset of depression, contributing to communication difficulties[6]. Lincoln and colleagues also found that psychological distress following stroke was related to expressive communication impairment and level of disability in personal activities of daily living related to distress (measured by Nottingham Extended Activities of Daily Living Scale). Distress was persistent in the first 6 months after stroke and it was concluded that appropriate treatment strategies need to be developed and evaluated for patients who have communication impairments[7].

3. References to the research

1. das Nair, RD and Lincoln NB (2007). Cognitive rehabilitation for memory deficits following stroke. *Cochrane Systematic Review*. DOI: 10.1002/14651858.CD002293.pub2. IF: 5.705, Citations 5.

2. Bowen A, Lincoln NB (2007). Cognitive rehabilitation for spatial neglect following stroke. *Cochrane Systematic Review 2.* DOI: 10.1002/14651858.CD003586.pub2. IF: 5.705, Citations 81

3. Loetscher T, Lincoln NB (2013). Cognitive rehabilitation for attention deficits following stroke. *Cochrane Systematic Review.* DOI: 10.1002/14651858.CD002842.pub2. IF: 5.705

4. Bennett HE, Thomas SA, Austen R, Morris AMS, Lincoln NB (2006). Validation of screening measures for assessing mood in stroke patients. *British Journal of Clinical Psychology,* 45: 367–376. DOI: 10.1348/014466505X58277. IF 2.333, Citations 19.

5. Kneebone II, Lincoln NB (2012). Psychological problems after stroke and their management: state of knowledge. *Neuroscience and Medicine,* 3, 83-89. DOI: 10.4236/nm.2012.31013. Citations 3.

6. Connell LA, Lincoln NB, Radford KA (2008) Somatosensory impairment after stroke: frequency of different deficits and their recovery. *Clinical Rehabilitation* 22 (8): 758–67. DOI: 10.1177/0269215508090674. IF 2.191, Citations 22.

7. Thomas SA, Lincoln NB (2008). Predictors of emotional distress after stroke. *Stroke* 39: 1240–1245. DOI: 10.1161/STROKEAHA.107.498279. IF 5.729, Citations 18.

4. Details of the impact

A key impact of Lincoln's research is changes to three different clinical practice guidelines with beneficiaries including clinicians, clinical psychologists, general practitioners, occupational therapists, stroke patients and their families.

Impact on Royal College of Physicians Guidelines and identification of evidence gap

Based upon Lincoln's ongoing work with the Royal College of Physicians, her research on intensity of time spent on rehabilitation, measurement of sensory problems and interventions for memory, attention and spatial awareness following stroke was featured in the 2012 RCP National Clinical Guidelines for stroke[a]. The assessment methods developed as part of the research (sensory test, SADQ and SDSA) are recommended within the guidelines. For example: *'All patients should be assessed for alteration in sensation. If indicated, a more formal assessment of sensory loss should be undertaken (eg using the Nottingham Sensory Assessment, Erasmus medical centre version)'*[a].

Impact of better identification of psychological problems

Lincoln's research first highlighted the need for better identification and assessment of

psychological problems after stroke and how these relate to cognitive dysfunction[5,7]. This gap in treatment contributed to the development of the NHS Improvement '*Psychological Care After Stroke'* report[b]. This is a guide for clinical practitioners to support the establishment and development of services for psychological care of people with cognitive and mood disorders following stroke. In the report, and based upon her work, Lincoln outlines a treatment and referral pathway for stroke patients with cognitive dysfunction and mood disorders, utilising the role of occupational therapists and with better access to clinical psychologists. Lincoln worked with stroke patients to develop these strategies to ensure that changes put in place were applicable within a clinical setting. A stroke patient from Dorset, quoted in the Improvement Plan, describes the impact of these changes:
'I couldn't understand why things were so much harder… I couldn't follow things. I worked before my stroke and was…am… an intelligent man, but didn't feel that way anymore. The tests were interesting for me… some bits were so easy, other bits just made me unravel… things I knew I should be able to do. It really helped me and my wife that the girls explained why this was happening… that it was the stroke, not me. I guess I felt it gave me some control to understand it… now I just hope there will be some improvement'[b].

NCGC Stroke Rehabilitation Guideline Change
Lincoln's work also contributed to the 2011 Stroke Rehabilitation Guidelines produced by the National Clinical Guideline Centre (NCGC)[c]. NCGC produce evidence-based clinical practice guidelines on behalf of the National Institute for Health and Clinical Excellence (NICE), with the aim of improving the quality of NHS patient care in England and Wales. The guidelines cite Lincoln and colleagues' research on spatial neglect as supporting evidence for their recommendations on assessment and interventions and the provision of occupational therapy following stroke.

Finally, the group's influence on clinical guidelines and practice in stroke rehabilitation can also be seen internationally in the Australian National Stroke Foundation's Clinical Guidelines for Stroke Management 2010[d], particularly in relation to recommendations for the assessment and treatment of those with cognitive and attention deficits, spatial neglect[3], mood disturbance[5] and driving.

Development of Stroke Assessments and International Reach
The SADQ has also generated clinical service change. Clinicians in the UK now use the SADQ routinely for stroke patients and it is being used internationally with translations in French, Dutch, Greek, Italian, Japanese and Chinese[e].

A key feature of Lincoln's work on assessment development also included the SDSA, to assess fitness to drive following a stroke. This has had an impact on clinical services and Australian, North American, European and Hebrew versions of the tests have been developed[e]. Researchers in China and Japan are currently conducting translation and validation studies to extend the Asian market for this assessment. For the Japanese arm, the Manager of the Department of Occupational Therapy in Inobe Hospital reported in 2013 that: the translation of SDSA to Japanese has been completed with the support of KICTEC Co, one of the largest road sign construction companies in Japan[f]. A multi-centre trial to establish the SDSA in hospitals and universities across Japan is underway and data are due to be collected from 100 stroke patients who have undergone SDSA evaluation[f].

Finally, the SDSA has played a role in informing overseas guidelines on driving safety following stroke in the form of Expert Panel Recommendations presented to the Federal Motor Carrier Safety Administration in the USA[g].

Impact on engagement of the stroke practice community
Lincoln's research has achieved significant reach across the clinical practice community working directly with stroke patients through the setup of the Organisation for Psychologists Researching In Stroke group (OPSYRIS) in 2002. The OPSYRIS is the national body of researchers and clinicians in stroke in the UK (for psychologists based primarily in practice http://wfnr.co.uk/en/special-interest-groups/organisation-for-psychological-research-into-stroke-opsyris/) and a sub-group of the World Federation for Neurorehabilitation. Alongside annual meetings across the UK, through

this network Lincoln developed a wide range of collaborative projects with practising clinicians, including the mood assessment project which led to direct impacts on clinical practice. The Chair of OPSYRIS Dr Bowen describes Lincoln's role in the growth of this group as fundamental:

'Nadina Lincoln ensured the continuity and growth of the group…during her chairmanship OPSYRIS grew from a small group of psychologists to a current multidisciplinary membership of 143, and attendance at annual meetings is usually about 50 people. Through Nadina Lincoln's strong leadership and international reputation OPSYRIS has become a special interest group of the World Federation for NeuroRehabilitation[h]

5. Sources to corroborate the impact

a. Royal College of Physicians UK National Clinical Guideline for Stroke (4th Ed) September 2012, Prepared by the Intercollegiate Stroke Working Party.
b. NHS Stroke Improvement Plan Psychological care after stroke. Improving stroke services for people with cognitive and mood disorders
c. National Clinical Guideline Centre: Stroke rehabilitation, the rehabilitation and support of stroke patients. Methods, evidence and recommendations July 2011
d. Australian Clinical Guidelines for Stroke Management 2010. National Stroke Foundation. Australian Government National Health and Medical Research Council
e. SADQ and SDSA download links as well as all translated versions available via the Institute's website (http://www.nottingham.ac.uk/medicine/about/rehabilitationageing/publishedassessments.aspx)
f. E-mail from Manager of the Department of Occupational Therapy in Inobe Hospital, Japan
g. Expert Panel Recommendations Stroke and Commercial Motor Vehicle Driver Safety. USA Federal Motor Carrier Safety Administration January 2009
h. E-mail from Dr Audrey Bowen (Chair: Organisation for Psychologists Researching In Stroke group)