Institution:
Glasgow Caledonian University (GCU)

Unit of Assessment:
3: Allied Health Professions, Dentistry, Nursing and Pharmacy

Title of case study:
Improving services for people with aphasia after stroke through enhancing evidence-based policy and service standards

Period when the underpinning research was undertaken:
Jan 2000 to July 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI
Prof Marian Brady	Prof of Stroke Care & Rehabilitation	1999 – present
Dr Myzoon Ali	Senior Research Fellow	2008 – present
Dr Pauline Campbell	Research Fellow	2012 – present

Period when the claimed impact occurred:
Aug 2013 to July 2020

Is this case study continued from a case study submitted in 2014?
No

1. Summary of the impact

Professor Brady's GCU research was instrumental in changing aphasia rehabilitation policy and standards for stroke survivors with problems speaking, understanding, reading and writing language across 23 countries including Australia, Brazil, Canada, Germany, Morocco, Norway, South Korea and the UK. National stroke service-delivery guidance was informed by GCU-led Cochrane systematic reviews, providing ground-breaking, conclusive evidence that speech and language therapy (SLT) benefits aphasia recovery, informing specialist aphasia service development within the emergent Croatian, Iranian, Lithuanian and Turkish SLT profession. GCU-led data-syntheses established that high intensity, acute-stroke SLT, where tolerated, was beneficial and mobilising technology and trained non-professionals effectively augments rehabilitation services.

2. Underpinning research

Despite greater rehabilitation resource use, stroke survivors with aphasia experience more functional impairments, with fewer returning home or to work than those without aphasia. Enhancing aphasia rehabilitation services is a research priority. Since 2010, GCU researchers (Brady, Ali and Campbell) have delivered high quality, award winning research, which significantly impacted on international aphasia rehabilitation policy and practices [G1-6].

In a research context characterised by small scale studies, our world leading GCU-led Cochrane systematic reviews and meta-analyses [R1,2] addressed three priority questions: comparing the effectiveness of SLT to (i) no therapy, (ii) social support or (iii) alternative SLT approaches. Led by Prof Brady the 2012 systematic review (last search date July 2011) included 39 randomised controlled trials (RCTs) and 2518 people with aphasia [R1, G1] providing the first definitive systematic review evidence that SLT benefits recovery, specifically functional communication, reading, writing, and expressive language, compared to no access to therapy, vital high-quality research evidence supporting the existence (or establishment) of specialist SLT aphasia rehabilitation services.

Prof Brady also led the 2016 review update (last search September 2015), undertaken concurrently with the UK Intercollegiate Stroke Working Party Stroke Rehabilitation Guideline update, reducing research waste, and ensuring the currency of the evidence synthesis informing the clinical recommendations. Based on 57 trials (3002 participants [R2, G1,2]), new meta-

analyses highlighted that high intensity SLT (up to 15 hours weekly) benefited functional communication and exclusively identified that benefits were only observed amongst people within three months after stroke, who were significantly less likely to tolerate intensive regimens [R2, G1,2]. Delivering high intensity SLT within service resource constraints is challenging. The GCU-led review meta-analysis also concluded that therapist-directed interventions using technology (telerehabilitation or software), or trained non-professionals (family members, volunteers, or assistants) was as effective as face-to-face SLT with a therapist [R1,2, G1,2].

Increasingly, technology-based SLT delivery models augment aphasia rehabilitation services to support high intensity SLT. In 2013, collaborating with Chief Investigator Dr Palmer (University of Sheffield), the NIHR Health Technology Assessment funded a definitive RCT which demonstrated that self-managed, specialist software supported word-finding recovery in people with aphasia [R3, G6]. In collaboration with Dr Øra and Associate Professor Becker from Sunnaas Rehabilitation Hospital, Norway an RCT demonstrated the clinical and research feasibility of an aphasia telerehabilitation service [R4, G3,4]. Both remote SLT delivery models proved feasible, with clinical engagement accelerating in the UK, Norway and internationally in the context of the COVID-19 pandemic and restrictions on face-to-face therapy.

GCU's aphasia research is a primary reference point in the establishment of new aphasia rehabilitation services in regions where none previously existed [R1-2,5; G1-5]. A GCU-led collaboration, currently involving >200 aphasia researchers from 36 countries, led to several collaborative research projects, including the development of an international aphasia research database [G5]. The dataset supported a one-stage meta-analysis of 5928 individual participants data, highlighting the SLT interventions associated with the greatest language recovery (speaking, understanding, reading and writing outcomes), directly informing the design and development of novel aphasia services [R5, G5].

3. References to the research

The selected research publications (of approximately 30) include the first high quality systematic review evidence of the effectiveness of SLT for aphasia, therapy delivery models, intensity, timing and acceptability [R1,2]. Regularly amongst the Cochrane Stroke Group's Top 5 downloads they made a significant contribution to international policy and services which was recognised in 2017 with the international Robin Tavistock Award to Prof Brady for "establishing a rigorous and strong evidence base … [which] has influenced the provision of SLT services locally, nationally and internationally" for people with aphasia [R1-3]. Nationally funded, multicentered, clinical RCTs of technologically innovative SLT delivery models provide vital evidence of clinical and cost effectiveness, feasibility and patient acceptability [R4,5, G3,4,6]

Research:

- [R1] Brady MC, Kelly H, Godwin J, Enderby P. Speech and language therapy for aphasia following stroke. Cochrane Database of Systematic Reviews 2012, Issue 5. Art. No.: CD000425. DOI: https://doi.org/10.1002/14651858.CD000425.pub3
- [R2] Brady MC, Kelly H, Godwin J, Enderby P, Campbell P. Speech and language therapy for aphasia following stroke. Cochrane Database of Systematic Reviews 2016, Issue 6. Art. No.: CD000425. https://doi.org/10.1002/14651858.CD000425.pub4
- [R3] Palmer R, Dimairo M, Cooper C, Enderby P, Brady M, Bowen A, Latimer N, Julious S, Cross E, Alshreef A, Harrison M, Bradley E, Witts H, Chater T. Self-managed, computerised speech and language therapy for people with chronic aphasia post-stroke compared to usual care or attention control (Big CACTUS): a single-blind multi-centre randomised, controlled trial in a health-care setting. Lancet Neurology 2019;18(9):821-833. https://doi.org/10.1016/S1474-4422(19)30192-9
- [R4] Øra Prag H, Kirmess M, Brady MC, Partee I, Hognestad Bjor R, Johannessen Bertheau B, Bente T, Becker F. The effect of augmented speech-language therapy delivered by telerehabilitation on post stroke aphasia – a pragmatic pilot randomized controlled trial. Clinical Rehabilitation 2020;34(3);369-381. https://doi.org/10.1177/0269215519896616

- [R5] The RELEASE Collaboration: Brady MC, Ali M, VandenBerg K, Williams LJ, Williams LR, Abo M, Becker F, Bowen A, Brandenburg C, Breitenstein C, Bruehl S, Copland DA, Cranfill TB, di Pietro-Bachmann M, Enderby P, Fillingham J, Galli FL, Gandolfi M, Glize B, Godecke E, Hawkins N, Hilari K, Hinckley J, Horton S, Howard D, Jaecks P, Jefferies E, Jesus LMT, Kambanaros M, Kang EK, Khedr EM, Kong AP-H, Kukkonen T, Laganaro M, Lambon Ralph MA, Laska AC, Leemann B, Leff AP, Lima RR, Lorenz A, MacWhinney B, Marshall RS, Mattioli F, Maviş İ, Meinzer M, Nilipour R, Noé E, Paik N-J, Palmer R, Papathanasiou I, Patricio BF, Pavão Martins I, Price C, Prizl Jakovac T, Rochon E, Rose ML, Rosso C, Rubi-Fessen I, Ruiter MB, Snell C, Stahl B, Szaflarski JP, Thomas SA, van de Sandt-Koenderman M, van der Meulen I, Visch-Brink E, Worrall L & Wright HH. REhabilitation and recovery of peopLE with Aphasia after StrokE (RELEASE): A protocol for a systematic review-based Individual Participant Data (IPD) meta- and network meta-analysis. Aphasiology 2020;34(2):137-157. https://doi.org/10.1080/02687038.2019.1643003

Grants:

- [G1] Chief Scientist Office core-funding grant Nursing, Midwifery and Allied Health Professions Research Unit at Glasgow Caledonian University Brady MC £ 2,514,534 [Jan 2011-Dec 2016].
- [G2] Clinical Academic Careers for Scotland Grant, Campbell P (Co-I) Scottish Government Health and Social Care Directorates £480,980 [Aug 2014-Jun 2017].
- [G3] Collaboration of Aphasia Trialists. Brady MC (PI) European Cooperation in Science and Technology (COST) €500,000 [May 2013-April 2017].
- [G4] Collaboration of Aphasia Trialists Phase 2. Tavistock Trust for Aphasia. Brady MC (PI) 3 years £93,608 [May 2017-Jan 2021]
- [G5] REhabilitation and recovery of peopLE with Aphasia after StrokE (RELEASE) Brady MC (PI) Ali M (Co-I), National Institute for Health Research (NIHR), Health Services and Delivery Research. £446,158 [Nov 2015-Oct 2017].
- [G6]. Clinical and cost effectiveness of aphasia computer therapy compared with usual stimulation or attention control long term post stroke (Big CACTUS). NIHR Health Technology Assessment. Brady (Co-I) £1,640,038 over 54 months [Sep 2013-Feb 2018]

4. Details of the impact

Introduction

Prof Brady's aphasia research significantly impacted international stroke rehabilitation policies and practice across 23 countries (including Australia, Brazil, Canada, Croatia, Germany, Italy, Lithuania, Norway, Portugal, South Korea, Spain, Sweden, the US and UK). People with stroke-related aphasia, therapists and national health services benefited from high-quality evidence of SLT-related recovery, particularly early, intensive therapy, informing rehabilitation guidelines, driving clinical standards, delivery, (and internationally) reimbursement and the foundation of new aphasia services.

Impact 1: International Stroke-Related Aphasia Rehabilitation Policy

Brady's ground-breaking Cochrane systematic review evidence, that SLT benefits stroke-related aphasia recovery compared to no therapy [R1], continues to underpin international multidisciplinary rehabilitation guidelines, informing service provision in Korea and the USA [C1]. Prior to Brady's research, this high-quality evidence was absent.

The Action Plan for Stroke in Europe 2018-2030 [C2] by the Stroke Alliance for Europe (international stroke survivor voluntary groups) and multidisciplinary European Stroke Organization, utilised expanded Cochrane evidence [R2] demonstrating the benefits of SLT across multiple language modalities (everyday communication, reading and writing) to establish new aphasia rehabilitation "targets for implementation of evidence based … stroke services to 2030" [C2 p309]. Evidence of SLT benefits, particularly high intensity treatment, was endorsed by several country-specific multidisciplinary stroke clinical guidelines (Australia, Canada, Norway, Republic of Korea, Sweden, USA [C1- pages numbers in section 5]). A Norwegian

Stroke Guideline Working Group Lead confirmed that Prof Brady's research [R2] was 'highly influential' in changing their 2017 aphasia rehabilitation policy which was consequently "more informed, offered more practical advice to healthcare professionals" [C3].

Impact 2: International aphasia rehabilitation practice

Internationally, SLT is an emerging profession. Aphasia rehabilitation improvements reflect evidence-informed innovation [R3,4] and multidisciplinary decision-making across disparate service environments [C1]. Professional resources including the Australian Rehabilitation Best Practice Statements, direct therapists to optimal practice and the underpinning evidence [C1, R1,2]. Globally, informed by Brady's research, BMJ Best Practice and Cochrane Clinical Answers are accessible, trustworthy, up-to-date rehabilitation evidence-summaries supporting evolving services [C4-5, R2]. In March 2019, neurologists and linguists in Iran, used Brady's research findings to inform the design of a "new aphasia service providing aphasia therapy for all stroke patients with aphasia", reporting that "high intensity therapy has been critical in the recovery of our patients to communicate clearly." [C6, R2,5].

International survey respondents (including speech and language therapists, doctors, psychologists and neurolinguists) indicated that GCU-led research findings [R1,2] contributed to changes in aphasia rehabilitation between August 2013 and July 2020, which is consequently initiated earlier after stroke (Australia, Croatia, Germany, Ireland, Italy, Lithuania, Morocco, Norway, Portugal, Spain, the Netherlands and UK) at a higher intensity (Australia, Brazil, Canada, Croatia, Cyprus, Germany, Morocco, Norway, Portugal, Spain, Sweden, Switzerland, the Netherlands, UK), at a higher dosage (Brazil, Cyprus, Italy, Morocco, Norway, Spain, Sweden, UK) and over a longer duration (Brazil, Canada, Croatia, Cyprus, Morocco, Spain, UK) [C7]. A clinical director described how the 2016 Cochrane review [R2] was instrumental in changing how Norwegian therapists "deliver aphasia therapy, from typically 1 hr/week every second week … to at least 3 weeks of intensive therapy", resulting in "improvements in aphasia rehabilitation services, more focused therapy sessions… the opportunity for more group therapy and peer support leading to language improvements and better experience for these patients" [C3].

UK Stroke-Related Aphasia Rehabilitation Policy

Brady's aphasia research underpinned UK rehabilitation guidelines, whose recommendations directly inform NHS SLT service delivery standards. The 2016 Intercollegiate Stroke Working Party guideline, drawing on updated Cochrane review meta-analyses [R2], highlighted the multi-modality language benefits of SLT and the clinical equipoise relating to optimal theoretical therapeutic approach and the effectiveness of alternative therapy delivery models [C8 p65]. Intensive SLT benefits (for those <3 months after stroke) were emphasized, with therapists urged to consider the acceptability of high-intensity interventions for some stroke survivors [R2, C8 p65]. Prior to Brady's review, this high-quality evidence was absent.

Brady's "excellent quality" Cochrane review [R1], highly praised in the 2014 Royal College of Speech and Language Therapists' resource manual for Clinical Commissioning and Planning Services [C9 p16], supports investment in NHS SLT services. The 2019 National Institute for Health and Care Excellence (NICE) evidence surveillance determined that Brady's 2016 research [R2] was likely to change existing NICE recommendations (2013) which "makes no recommendations on the intensity of SLT" and the acceptability of high intensity or dose regimens "may need consideration" [C10 p21]. Recently, UK survey respondents (speech and language therapists) indicated that following the GCU-led Cochrane review findings [R2], SLT was now delivered earlier, at a higher intensity, dosage and over a longer duration [C7].

5. Sources to corroborate the impact

- [C1] Title: Combined international stroke rehabilitation guidelines for the following countries: Date: 2014-2020
  - Korea (original language), p71-72 of original document: Clinical Practice Guideline for Stroke Rehabilitation in Korea 2016. Brain Neurorehabilitation 2017; 10(Supp 1): e11. https://dx.doi.org/10.12786/bn.2017.10.e11.

- Sweden (original language), p467-473, 476-478 of original document: Sweden National Clinical guidelines on stroke rehabilitation. https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/nationella-riktlinjer/2020-1-6545-kunskapsunderlag-2020.pdf
- Australia, p18, 20, 22-23 of original document: Australian 2014 Aphasia Rehabilitation Best Practice Statement. http://www.aphasiapathway.com.au/flux-content/aarp/pdf/2014-COMPREHENSIVE-FINAL-01-10-2014-1.pdf
- Canada, p1 of selected webpages: Canadian Stroke Best Practices Chapter 10. Rehabilitation to improve language and communication, 2019. https://www.strokebestpractices.ca/recommendations/stroke-rehabilitation/rehabilitation-to-improve-language-and-communication
- Norway, p1-3 of selected webpages: Norwegian Stroke Guidelines Norwegian Department of Health (2017); https://www.helsedirektoratet.no/tema/hjerneslag.
- USA, e123-124 of original document: Guidelines for Adult Stroke Rehabilitation and Recovery: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. Stroke 2016; 47(6): e98-e169 Jan 2016. DOI: https://dx.doi.org/10.1161/STR.0000000000000098.

- [C2] Title: Action Plan for Stroke in Europe 2018-2030 European Stroke Organization and the Stroke Alliance for Europe. Date: Dec 2018; Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6571507/

- [C3] Title: Testimonial from a Clinical Medical Director in Norway. Date: 25th Nov 2020

- [C4] Title: BMJ Best practice website – Assessment of Aphasia. Date: July 2018; Link: https://bestpractice.bmj.com/topics/en-gb/973#referencePop14

- [C5] Title: Cochrane Clinical answers. Date: 12th October 2016; Link: https://www.cochranelibrary.com/cca/doi/10.1002/cca.1384/full

- [C6] Title: Testimonial reporting impact on aphasia rehabilitation services in Iran. Date: 17th Dec 2020

- [C7] Title: Ierna M, Brady MC (2020) Aphasia research at GCU – an international perspective; data analysis and summary report of survey findings. Date: 14th Dec 2020; Link: https://researchonline.gcu.ac.uk/ws/portalfiles/portal/43435367/Aphasia_survey_report_FINAL_14DEC2020V2_MXI.pdf

- [C8] Title: 5th Edition of the National Clinical Guideline for Stroke (prepared by the Intercollegiate Stroke Working Party (ISWP) Royal College of Physicians, London). Date: October 2016; Link: https://www.rcplondon.ac.uk/guidelines-policy/stroke-guidelines

- [C9] Title: Royal College of Speech and Language Therapists Resource Manual for Commissioning and Planning Services for SLCN. Date: 2013; Link: https://docplayer.net/30347044-Rcslt-resource-manual-for-commissioning-and-planning-services-for-slcn.html

- [C10] Title: National Institute for Health and Care Excellence: 2019 surveillance of Stroke rehabilitation in adults (2013) NICE guideline CG162. Date: 2019; Link: https://www.nice.org.uk/guidance/cg162/evidence/appendix-a-summary-of-evidence-from-surveillance-pdf-6723786638