Nursing, Midwifery and Allied Health Professions Research Unit

RELEASE: An individual participant data meta-analysis, incorporating systematic review and network meta-analysis, of complex speech-language therapy interventions for stroke-related aphasia

RELEASE
REhabilitation and recovery of peopLE with Aphasia after StrokE

THE TAVISTOCK TRUST FOR APHASIA

Background:

Worldwide over 3.5 million people each year have a stroke causing aphasia. Aphasia is a language problem that affects speaking, understanding of speech, reading and writing. Speech and language therapy (SLT) supports aphasia recovery, but therapists need better information about what type of therapy should be offered, how often, for how many hours each week, and for how long to enable people with aphasia to make the best recovery. We explored how language recovery relates to SLT, stroke and type of aphasia.

Aims and objectives:

Speech and language therapy (SLT) benefits people with stroke-related aphasia. Maximising language recovery is a research priority for stroke survivors, carers and health care professionals. We needed greater insight into the contribution to recovery across language domains made by individual characteristics (for example age, stroke and aphasia profiles) and by the components of SLT (target and theoretical approach, delivery model and regimen).

- What is the pattern of language recovery following stroke-related aphasia?
- What are the predictors of language recovery outcomes following aphasia?
- What are the components of effective aphasia rehabilitation interventions?
- Are some interventions (or intervention components) more beneficial for some patient subgroups (individual, stroke or aphasia characteristics) than others?

Methods:

We created an international aphasia database that included individual participant data (IPD) on demographics, stroke profiles, language impairment, SLT interventions, and subsequent outcomes across a range of language domains. The database followed a pre-specified protocol (PROSPERO CRD42018110947).

We systematically searched the following databases (inception to September 2015) using an RCT optimised search strategy: Cochrane Stroke Group Trials Register, CENTRAL and other Cochrane Library Databases (CDSR, DARE, HTA), MEDLINE, EMBASE, CINAHL, AMED, LLBA, and SpeechBITE.

We imposed no language restrictions. We searched for datasets containing anonymised IPD on at least ten people with aphasia following stroke (collected with ethical-approval), measures of language impairment, and time since stroke.

The identified records were screened for eligibility. Full-text reports were reviewed by two independent researchers, with disagreements resolved through discussion with a third where necessary. Randomised controlled trial (RCT), non-randomised, cohort, case series and registry datasets were included. Primary researchers of identified records were invited to contribute electronic datasets. Eligible datasets in the public domain were also identified and transcribed. We developed and piloted a data extraction table, which supported retrieval of demographic, environmental, stroke and language data at IPD level as well as descriptors at study level including quality criteria (selection, detection, attrition bias).

SLT interventions from identified studies described targeted rehabilitation tasks that sought to enhance language abilities, activities, or participation. These interventions were extracted using the Template for Intervention Description and Replication and categorised by impairment target and theoretical approach.

Data extraction was rigorously checked by a second researcher. Where possible, we confirmed data extraction with the primary researchers. Ensuring data integrity was essential to the project.

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We converted all datasets into SAS 9.4. Prior to analysis, we cleaned all data relating to pre-specified variables required for our planned analyses. Across datasets language abilities were captured on a range of different assessment tools (sometimes in various language adaptations). Language or version variations were treated as separate tools. For each domain we identified the assessments used, calculated the median score, interquartile range [IQR], minimum and maximum, and identified an anchor measure for that domain (the measurement used by the most datasets). All other measures for that domain (minority measures) were transformed to match the format, distribution and range of each anchor measure using a pre-specified algorithm.

Our project aimed to generate hypotheses, and to highlight avenues for further research. We therefore did not employ a strict experimental, hypothesis testing approach but instead used statistical inferencing to inform the description of participant populations, data items and research questions for future large-scale definitive experimental investigations.

We conducted a one-stage, random effects meta-analysis and network meta-analysis based on our large IPD database. Analyses comprised IPD from both electronic datasets and public domain IPD; these combined data were filtered for relevance to each analysis into a single model (which considered the clustering of IPD within a study). In this way we explored the subtleties of a highly heterogeneous group of people with aphasia after stroke, controlled for individual predictors. This supported detailed exploration of the influence of participant-level covariates on SLT treatment effects across a range of language domains.

Current status:

We created a database of 5928 IPD on people with aphasia after stroke, gathered from 174 datasets across 28 countries. Work is ongoing on the transformation, analysis, interpretation and reporting of the findings to our funder and beyond.

Funder:

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