This is a repository copy of *Where are we now with aphasia after stroke?*.

White Rose Research Online URL for this paper:
http://eprints.whiterose.ac.uk/167975/

Version: Published Version

Article:
Enderby, P. orcid.org/0000-0002-4371-9053 and Sutton, L.
orcid.org/0000-0003-3327-5927 (2020) Where are we now with aphasia after stroke?
Annals of Indian Academy of Neurology, 23 (8). S57-S62. ISSN 0972-2327

https://doi.org/10.4103/aian.AIAN_666_20

Reuse
This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike (CC BY-NC-SA) licence. This licence allows you to remix, tweak, and build upon this work non-commercially, as long as you credit the authors and license your new creations under the identical terms. More information and the full terms of the licence here: https://creativecommons.org/licenses/

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk/

ISSN 0972-2327

www.annalsofian.org

AIAN

Annals of Indian Academy of Neurology

Official Publication of Indian Academy of Neurology

Volume 23 • Supplement 2 • 2020

APHASIA
Guest Editor: Apoorva Pauranik

Wolters Kluwer Medknow

Indexed with EMBASE and Science Citation Index (E)

Annals of Indian Academy of Neurology impact factor 0.905

PubMed

Where are we now with aphasia after Stroke?

Pam Enderby, Laura Sutton

School of Health and Related Research, University of Sheffield, Regent Street, Sheffield S1 4DA, United Kingdom

Abstract

Objective: To provide a brief review of research literature relating to the current state of knowledge regarding speech and language therapy for people with aphasia and place these research findings within the context of outcome data of non-selected patients receiving usual therapy in the UK. **Methods:** Part 1 presents a literature search aimed at exploring up-to-date information related to the nature and evolution of aphasia, the impact of therapy and the changing nature of therapy. This provides the context of what may be achieved in rehabilitation. Part 2 examines of the impact of speech and language therapy on 1664 prospective patients receiving therapy for aphasia after stroke by 3 different types of service provision was collected and statistically analysed. The Therapy Outcome Measure was used to identify change in impairment, activity, participation and well-being at the beginning and end of therapy. **Results:** The findings from the non-selected group of patients supports the conclusions of the reported randomised control trials in that speech and language therapy for post stroke aphasia is associated with gains in one or more of the domains of the International Classification of Functioning.

Keywords: Aphasia, outcome measurement, quality, stroke

Guest editor's notes: This masterly invited review by one of the stalwarts of aphasiology underscores the importance of simple observational data beyond the limits of RCTs. Apart from reviewing the current state of affairs, the authors demonstrate that it is possible and rewarding to gather data about 'Therapy Outcome Measure' if they are well-conceived and easy to use. Such tasks are feasible at ground level, in real life circumstances by health care professionals (even those with minimum additional training.)

Part 1 Background to Aphasia

Most studies indicate that one-third of patients with acute stroke present with aphasia.[1] Aphasia is more than just the loss of speech. It can affect a person's ability to understand, read, write and use numbers as well as all forms of communication including naming and gesture. Unsurprisingly, it has a major impact on reducing the well-being of the client and their family.

Natural history

The natural course of aphasia in 119 unselected, consecutive stroke patients was investigated by Laska *et al*.[2] who reviewed the morbidity, mortality and recovery associated with different presentations of aphasia. These authors found that at the 18-month follow-up approximately one quarter had recovered completely, 43% still had significant aphasia with the severity of aphasia reducing from 25% to less than 10%. Those with mild aphasia initially were likely to recover 'completely'. However, mortality in patients with aphasia during the 18 month follow-up was twice that of non-aphasic stroke patients. The authors also noted that younger patients recovered to a greater extent than older patients.

In a similar study, Palle Møller Pedersena *et al*.[3] reviewed 270 consecutive acute stroke patients with aphasia and found that the frequencies of the different types of aphasia in acute first-ever stroke were: global aphasia 32%, anomic aphasia 25%, Wernicke's aphasia 16%, Broca's aphasia 12%, transcortical sensory 7%, conduction 5%, isolation 2%, and transcortical motor 2%. These figures are not substantially different from those which have been found in previous studies of less selected populations. The types of aphasia have been noted to change to a less severe form during the first year. One year after stroke, the following frequencies were found by Palle Møller Pedersena *et al*.[3]: anomic 29%, Broca's 13%, global 7%, conduction 6%, Wernicke's 5%, transcortical motor 1%, transcortical sensory 0%, and isolation 0%. Thus, it is important to note that the distribution of aphasia types in acute and chronic aphasia is quite different.

Screening and assessment

It is important to be able to identify as soon as possible whether a patient admitted to hospital with a stroke has aphasia and its

Address for correspondence: Prof. Pam Enderby, School of Health and Related Research, Innovation Centre, University of Sheffield, Regent Street, Sheffield S1 4DA, United Kingdom.
E-mail: P.M.Enderby@Sheffield.ac.uk

Submitted: 23-Jun-2020 **Accepted:** 27-Jun-2020 **Published:** 25-Sep-2020

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

DOI: 10.4103/aian.AIAN_666_20

severity in order to assess the patient's ability to understand and communicate make informed decisions when involved in discussions relating to treatment options. Speech and language therapists frequently use detailed psychometrically robust aphasia assessments but this may be impractical at an early stage following a person's admission to hospital. Thus screening assessments that can be carried out by a broad range of healthcare professionals should be considered. The Frenchay Aphasia Screening Test (FAST)[4] has been translated into many different languages and was developed for this purpose. It is a quick and simple method of identifying which patients having communication difficulties indicating the severity of any expressive or receptive difficulties and who should be referred for a more detailed evaluation performed by the speech and language pathologist. Importantly, such screening allows early identification of aphasic difficulties and facilitates improved management, rehabilitation requirements and support of relatives.

More detailed assessment using carefully constructed tests to identify any problems with comprehension, word finding, reading, writing, semantics and syntactic is important in order to discriminate between the types of aphasia (detailed in the paragraphs above) and to plan targeted therapy. These detailed assessments can also be used as outcome measures to identify the changing nature of the aphasia type as well as indicating which areas have improved and which have not. However, it has been found, disappointingly, that it is unusual for the therapists to repeat the longer aphasia tests at the end of intervention, thus reducing their contribution to outcome measurement.

Impact of speech and language therapy

Many research studies reviewing the efficacy and effectiveness of speech and language therapy (SLT) on the remediation of aphasia after stroke have provided equivocal results. It is likely that this is a result of the heterogeneous nature of the population as well as a lack of specificity in the components of the therapy/intervention provided. To address this the Release Collaboration[5] undertook a systematic search of databases and identified randomised controlled trials (RCTs) reviewing the effectiveness of speech and language therapy for persons with aphasia in order to extract and pool the individual participants data (IPD). They selected trials with at least 10 participants and eligible public domain datasets. Individual predictors of recovery (age, sex, time since onset) were controlled whilst examining the influence of SLT, as well as the theoretical approach of therapy, its context, delivery mode, inclusion of home practice and tailoring (by functional relevance or difficulty) on language outcomes. Risk of bias was considered and rated for each dataset and database.

The results of this detailed large dataset (5928 IPD from 174 datasets across 28 countries) indicated that speech and language therapy targeting both auditory comprehension and spoken language was associated with greatest gains on overall language ability. Word-finding therapy resulted in peak gains on naming as indicated by the Boston Naming Test[6] and auditory comprehension outcomes as found on the Aachen Aphasia Test[7] and the Token Test.[8] The study examined whether home practice was involved in therapy and indicated that the greatest gains on overall language ability were observed when interventions included this. However, the setting for therapy i.e., whether it was home-based or hospital-based made little impact to language improvements since baseline. Although, it is interesting to note that face-to-face SLT was associated with slightly greater overall language ability improvement than non-face-to-face approaches.

Tailoring of therapy to the individual communication needs of the patient was not reported in most studies, but when this information was available in the research reports, it indicated that improvements in overall language ability occurred alongside functionally relevant SLT compared to more general stimulation and untailored therapy. Furthermore, tailoring therapy to respond to the level of severity of aphasia was associated with slightly higher gains on overall language. Conversely, and somewhat surprisingly, untailored SLT was associated with best gains in naming and functional communication. This meta-analysis suggests that targeted SLT is associated with specific language benefits and that home practice is an important adjunct to direct therapy.

Technology in speech and language therapy for aphasia following stroke

Most studies of speech and language therapy for aphasia following stroke indicate that more therapy leads to better results. However, workforce and economic constraints often restrict the amount of speech and language therapy that is available. A pragmatic, superiority, three-arm, individually randomised, single-blind, parallel group trial[9] recruited patients aged over 18 years who had been diagnosed with aphasia post-stroke at least 4 months before randomisation. Participants were randomly assigned with the use of computer-generated stratified blocked randomisation (stratified by site and severity of word finding at baseline) into one of 3 groups: 6 months of usual care (usual care group), daily self-managed computerised speech and language therapy plus usual care (CSLT group), or attention control plus usual care (attention control group). The outcome assessors and trial statistician were masked to the treatment allocation.

More patients allocated to the computer group improved and many expressed a wish to continue with this form of therapy at the end of the trial. The results indicate that computerised speech and language therapy plus usual care resulted in a clinically significant improvement in personally relevant word finding but, disappointingly, did not result in an improvement in conversation. The authors recommend that future studies should explore ways to generalise new vocabulary into conversation for patients with chronic aphasia post-stroke.

Using technology to support and extend access to speech and language therapy seems desirable and acceptable. There are an increasing number of computer programs and apps being

specifically designed for use by patients on their own or to support and extend speech and language therapy. The Aphasia Software Finder https://www.aphasiasoftwarefinder.org/assists individuals to identify the most appropriate software or app to meet the individual therapy needs of the patient.

Outcome Measurement – Big data and contribution to Improving Quality of Services

Patients recruited into formal aphasia research studies frequently have an uncomplicated medical disorder without comorbidities and tend to be excluded from trials if they are not monolingual and do not have good eyesight and hearing.

These patients do not reflect the more diverse clinical caseload seen in therapy departments, hospitals or clinics. Gathering consistent and reliable data on every patient referred to speech and language therapy would provide us with a broader context in which to place and interpret carefully controlled research data. Furthermore, gathering data on each client will assist with examining variation in practice between services and comparing/benchmarking service provision.[10]

Speech and language therapy aims to improve more than the impairment of aphasia but also addresses broader issues of communication, social participation and the well-being of the individual and their carer. Despite this the majority of research concerns itself with examining changes in the impairment alone. When considering the impact of speech and language therapy on all clients with aphasia it is important to collect data on all aspects of our intervention in order to review the impact of rehabilitation more broadly. The Therapy Outcome Measures for Rehabilitation Professionals (TOM)[11,12] was designed to be a simple, reliable, cross-disciplinary and cross-client group method of gathering psychometrically robust information on the broader spectrum of issues associated with therapy/rehabilitation. The TOM was based on the 3 domains highlighted by World Health Organisations International Classification of Disability and Function.[13] of impairment (in this case, aphasia), activity (in this case, communication), and social participation. The TOM adds a further domain of 'well-being' of the client and carer since it has been found that improving well-being is often a goal in therapy.[14] This approach facilitates therapists, nurses and other health and social care professionals to describe the relative abilities of an individual across these four domains on an 11-point ordinal scale which incorporate the goals of rehabilitation at the beginning and end of an episode of care.

The procedures for using the TOM requires the health care professional to assess the individual referred for treatment using their usual assessment procedures, such as standardised tests, observation, report and consideration of medical and social history. Thus, no additional work/assessments or tests are required. It usually takes less than 3 minutes to assign the appropriate rating in the four domains.

A national database has been set up by the Royal College of Speech and Language Therapists[15] to collect information on all patients referred to speech and language therapy in participating services. This helps service providers, managers and funders to examine the variation in provision identifying service strengths and weaknesses and contributing to quality improvement.

Part 2 A Study of Non-Selected Patients With Aphasia Following Stroke Receiving Speech and Language Therapy

Background

Whilst the research cited above provides a considerable amount of information related to the impact of speech and language therapy on specially selected groups of patients we are less informed regarding the impact on non-selected patients receiving usual care or differences in service outcomes.

Methods

Participants

An extract was taken from the national database (ROOT) in April 2020. Patients with a primary medical diagnosis of cerebral vascular accident (CVA) and aphasia/dysphasia were identified. Small services ($n \leq 35$) were excluded giving a final sample of 1664. The remaining services were grouped according to similarity in service provision as follows:

Group 1 (n = 851)
Group 2: (n = 484)
Group 3: (n = 329)

Statistical analysis

Data were visually inspected prior to analysis. Age and sex were summarised using descriptive statistics. Formal between-group comparisons were not conducted due to high level of missing data in these fields.

Between-group differences in impairment, activity, participation, and well-being at admission were compared using analysis of variance (ANOVA), and at discharge using analysis of covariance (ANCOVA) with follow-up scores adjusted for baseline values. Model diagnostic checks were performed. Change scores and proportions of patients showing improvement in one, two, three and four domains are reported.

Results

Age and sex

Summaries of age and sex at admission are provided in Table 1. No data was collected in these fields by services in group 1 and there was a high amount of missing data in group 3.

Scores at admission to service

Mean scores upon admission to services are shown by domain and group in Table 2. There was some evidence of between-group differences in scores, with a tendency for lower scores in Group 3. Between-group differences were less than 0.5 points. It should be noted that Group 2 had 42% missing data in the fields of participation and well-being.

Characteristics of missing participants were checked. There was no evidence of age- or sex-bias.

Improvements in scores

Mean scores at follow-up are provided in Table 3. Between-group comparisons were made using ANCOVA, controlling for baseline score. There was evidence of between-group differences. Group 1 had the highest scores in all domains, with comparable values between Groups 2 and 3.

Mean change scores (follow-up minus baseline) are summarised in Table 4. All scores (all groups, all domains) were shown to increase over the course of therapy. Improvements were of the magnitude of 0.5 points or greater.

The proportion of patients showing improvements by number of domains is provided in Table 5. Data were excluded for patients who did not have complete baseline and follow-up data in all four domains (229 cases dropped).

Group 1 had a higher proportion of patients who improved in all four domains. Group 2 had less impact with nearly a 3rd of patients not being reported as changing in any of the domains. Group 3 had a positive impact on 37.8% of their patients improving on all 4 domains which is similar to group 1, but again had a high proportion, nearly one quarter, of patients who did not benefit at all. Reviewing the differences in the care pathways of these different services will assist in identifying the positive and negative influences affecting the outcome of patients with aphasia.

Historical data

Prior to the establishment of the national database (ROOT) being set up some services (different to those reported above) submitted data which assisted us in exploring the strengths and weaknesses of different service approaches. An example of this is provided in Figure 1 which illustrates direct comparison of two services

Service A provides data on 224 persons with stroke who have had aphasia. 59.4% of these improved their aphasic impairment where as 36% remained the same and 4% showed a reduced language ability. 54% improved their communication ability.

Comparing these pie charts illustrates the biggest difference between the services is on the carer well-being. Service A improving carer well-being in 73% of the cases whereas the pilot site showed little change in the majority with an improvement in only 34.8%. Further investigation exposed that the pilot site provided little support for the carers of people with aphasia whereas service A worked closely with a local stroke club which are aimed to support carers.

Table 1: Age and sex at admission to service

		Group 1 (*n*=851)	Group 2 (*n*=484)	Group 3 (*n*=329)	Overall (*n*=1664)
Age (years)					
n	0	484	38	522	
Mean (SD)	-	72.8 (15.0)	72.3 (47.7)	74.7 (15.0)	
Median (IQR)	-	76.0 (65.0, 83.0)	74.5 (63.8, 83.8)	75.0 (65.0, 83.0)	
Range	-	18.0, 100.0	37.0, 96.0	18.0, 100.0	
Sex					
n	0	484	38	522	
Male	-	232 (47.9%)	22 (57.9%)	254 (48.7%)	
Female	-	252 (52.1%)	16 (42.1%)	268 (51.3%)	

Table 2: Mean (SD) domain scores at admission to service

		Group 1 (*n*=851)	Group 2 (*n*=484)	Group 3 (*n*=329)	Overall (*n*=1664)	ANOVA
Impairment	*n*	851	484	329	1664	
	Mean (SD)	2.6 (1.3)	2.5 (1.4)	2.3 (1.4)	2.5 (1.3)	$F_{(2,1661)}$=6.74, p=0.001
Activity	*n*	851	484	329	1664	
	Mean (SD)	2.7 (1.3)	2.6 (1.5)	2.5 (1.4)	2.6 (1.4)	$F_{(2,1661)}$=2.91, p=0.055
Participation	*n*	848	280	328	1456	
	Mean (SD)	2.7 (1.3)	2.7 (1.4)	2.4 (1.3)	2.6 (1.3)	$F_{(2,1453)}$=5.39, p=0.005
Well-being	*n*	851	278	327	1456	
	Mean (SD)	3.1 (1.1)	3.2 (1.5)	2.8 (1.3)	3.1 (1.2)	$F_{(2,1453)}$=7.67, p<0.001

Table 3: Mean (SD) domain scores at follow-up

		Group 1 (*n*=851)	Group 2 (*n*=484)	Group 3 (*n*=329)	Overall (*n*=1664)	ANCOVA*
Impairment	*n*	851	484	329	1664	
	Mean (SD)	3.5 (1.2)	3.0 (1.4)	3.0 (1.4)	3.2 (1.3)	$F_{(2,1660)}$=27.74, p<0.001
Activity	*n*	851	484	329	1664	
	Mean (SD)	3.6 (1.2)	3.2 (1.4)	3.2 (1.4)	3.4 (1.3)	$F_{(2,1660)}$=20.21, p<0.001
Participation	*n*	848	281	329	1458	
	Mean (SD)	3.6 (1.2)	3.3 (1.4)	3.2 (1.4)	3.4 (1.3)	$F_{(2,1439)}$=14.29, p<0.001
Well-being	*n*	849	278	327	1454	
	Mean (SD)	3.9 (1.0)	3.6 (1.4)	3.6 (1.2)	3.8 (1.1)	$F_{(2,1439)}$=12.95, p<0.001

*Corrected for baseline values

Table 4: Mean (SD) change in score over the course of therapy

		Group 1 (*n*=851)	Group 2 (*n*=484)	Group 3 (*n*=329)	Overall (*n*=1664)
Impairment	*n*	851	484	329	1664
	Mean (SD)	0.8 (0.9)	0.5 (0.8)	0.7 (0.9)	0.7 (0.9)
Activity	*n*	851	484	329	1664
	Mean (SD)	0.9 (1.0)	0.6 (0.9)	0.7 (0.9)	0.8 (0.9)
Participation	*n*	845	270	328	1443
	Mean (SD)	0.9 (1.0)	0.6 (0.8)	0.8 (1.0)	0.8 (1.0)
Well-being	*n*	849	268	326	1443
	Mean (SD)	0.8 (1.1)	0.5 (0.9)	0.8 (1.1)	0.7 (1.0)

Table 5: Proportions of patients showing improvement over the course of therapy

	Group 1 (*n*=843)	Group 2 (*n*=267)	Group 3 (*n*=325)	Overall (*n*=1435)
Did not improve	103 (12.2%)	85 (31.8%)	74 (22.8%)	262 (18.3%)
Improved in one domain	72 (8.5%)	32 (12.0%)	30 (9.2%)	134 (9.3%)
Improved in two domains	112 (13.3%)	42 (15.7%)	47 (14.5%)	201 (14.0%)
Improved in three domains	158 (18.7%)	38 (14.2%)	51 (15.7%)	247 (17.2%)
Improved in all four domains	398 (47.2%)	70 (26.2%)	123 (37.8%)	591 (41.2%)

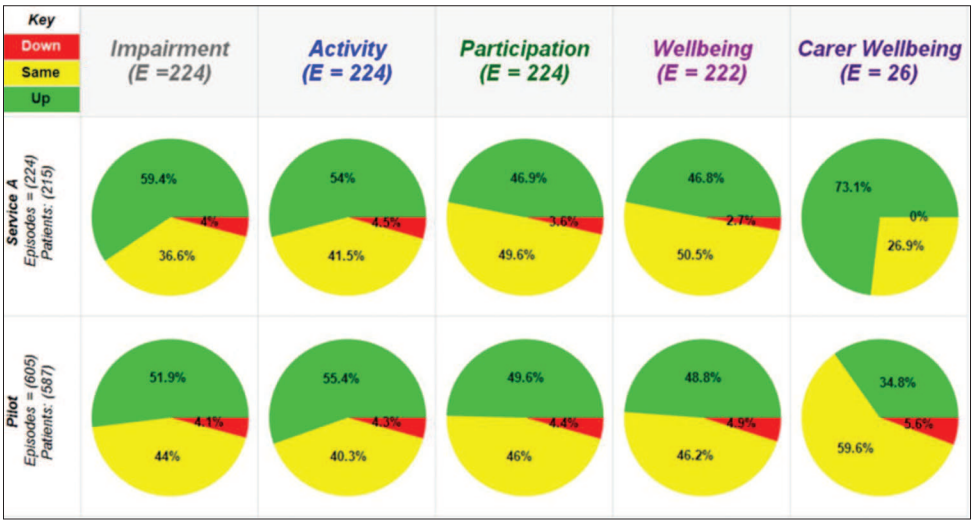

Figure 1: Therapy Outcome Measure Data from 2 Speech and Language Therapy Services illustrating impact of different service provision

Conclusion

The review of the literature and results of systematic reviews indicate a positive contribution of speech and language therapy to the outcome of aphasia for selected patients with this condition. However, the area of impact might be different according to the process of care. The ROOT outcome study incorporated data on a large sample of patients with relatively low variability thus giving confidence in the power to detect statistical differences even when small. A clinically significant difference in TOM score has been found to be 0.5.[9] Since the change scores in this study were 0.5 or greater, it provides evidence that therapy is doing what it should, i.e., having a positive impact on the majority of patients in some way or another. We had expected greater between group differences and had found such in earlier small studies. We now conclude that whilst services may vary in their provision and the differences in outcome remain modest the most interesting aspect to explore is why and how some services have a greater impact on reducing impairment (the aphasia) and others have a greater positive impact on social aspects such as participation and well-being.

Acknowledgements

The authors acknowledge the generous assistance of the Royal College of Speech and Language Therapists and particularly appreciate the assistance of Kathryn Moyse and Katie Chadd.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ferro JM, Madureira S. Aphasia type, age and cerebral infarct localisation. J Neurol 1997;244:505-9.
2. Laska AC, Hellblom A, Murray V, Kahan T, von Arbin M. Aphasia in acute stroke and relation to outcome. J Intern Med 2001;249:413-22.
3. Pedersena PM, Vinterb K, Olsenc TS. Aphasia after stroke: Type, severity and prognosis the Copenhagen aphasia study. Cerebrovasc Dis 2004;17:35-43.
4. Enderby P, Crow E. Frenchay Aphasia Screening Test: Validity and comparability. Disabil Rehabil 1996;18:238-40.
5. The RELEASE Collaborators. Aphasiology. 2019. doi: 10.1080/02687038.2019.1643003.
6. Kaplan E, Goodglass H, Weintraub S, Boston naming test. Philadelphia: Lea & Febiger. OCLC; 1983. 10450471.
7. Huber W, Poeck K, Willmes K. The Aachen Aphasia Test (AAT)". In: Rose FC, editor. Progress in Aphasiology. New York: Raven; 1984. 291-303.
8. Coupar AM. Detection of mild aphasia: A study using the token test. Br J Med Psychol 1976;49:141-4.
9. Palmer R, Dimairo M, Cooper C, Enderby P, Brady M, Bowen A, *et al*. Self-managed, computerised speech and language therapy for patients with chronic aphasia post-stroke compared with usual care or attention control (Big CACTUS): A multicentre, single-blinded, randomised controlled trial. Lancet Neurol 2019;18:821-33.
10. John A, Enderby P, Hughes A. Benchmarking outcomes in dysphasia using the therapy outcome measure. Aphasiology 2005;19:165-78.
11. Enderby P, John A, Petheram B. Therapy outcome measures for rehabilitation professionals: Speech and language therapy, physiotherapy, occupational therapy, rehabilitation nursing & hearing therapists. 2nd ed.. John Wiley & Sons Ltd.; 2006.
12. Enderby P, John A. Therapy outcome measures for rehabilitation professionals. 3rd ed.. J and R Publishing Services Ltd. Croydon UK; 2015
13. World Health Organization. ICF-CY, international classification of functioning, disability, and health: Children & youth version. Geneva: World Health Organization; 2007.
14. John A. Therapy outcome measures: Where are we now? Int J Speech Lang Pathol 2011;13:36-42.
15. Moyse K, Enderby P, Chadd K, Gadhok K, Bedwell M, Guest P. Outcome measurement in speech and language therapy: A digital journey. BMJ Health Care Inform 2020;27:e100085.