FIELD TESTING OF MANUAL FOR ADULT: NON-FLUENT APHASIA THERAPY IN KANNADA (MANAT-K)

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Abstract

The treatment of people with aphasia requires systematic approach for facilitation of recovery. Persons with aphasia exhibit divergent symptoms which vary according to the type and severity of aphasia. Use of culturally relevant material plays a vital role for bringing about heightened progress which results in effective generalization. It is also important to chart the progress in a systematic manner to contribute towards evidence based practice. Hence, there is a need to develop a manual which provides structured activities for persons with various types of aphasia. This manual is an outcome of the field tested project MANAT-K. The results of the study have shown that the performance of the ten participants with non-fluent aphasia using MANAT-K improved in its various domains i.e. functional communication, repetition, comprehension and expression, naming and reading and writing.

Key words: C*linical, adult language, skills*

Aphasia is described as a "multimodality reduction in the capacity to decode (interpret) and encode (formulate) meaningful linguistic elements. It is manifested as difficulties in listening, reading, speaking and writing'' (Darley, Aaronson & Brown, 1975, as cited in Benson & Ardila, 1996).

The management of persons with aphasia is a complicated task that involves the coordinated efforts of a rehabilitation team representing several disciplines. The speech language pathologist (SLP) being one of the key members of the team, faces a number of challenges while planning the management program for persons with aphasia. The reason is mainly due to the varied nature of the disorder, manifesting impairment in all the aspects of language. Thus, it has been stated by the researchers that the speech language pathologists must use language treatment programs that have been described in detail and proved to be effective (Shewan & Bandur, 1986). There are various authors who have proposed a number of therapy techniques for the treatment of non-fluent aphasia such as Language Orientated Treatment, Helm Elicited Program for Syntax Stimulation, Response Elaboration Training and so on. However, the effectiveness of these techniques depends on the usage of the linguistic material. Thus, it is important that the treatment programs are tailor made to suit the needs of a person with aphasia.

Authors have proposed a number of therapy techniques and manuals for the treatment of aphasia but, majority of them refer to the Western population (English language), for example, the Manual for Aphasia Therapy developed by Longerich (1968), An Auditory and Verbal Task Hierarchy by Ross and Spencer (1980). In the Indian context, Manual for Adult Non-Fluent Aphasia Therapy- in Hindi (MANAT-H, Deshpande & Goswami, 2004), Manual for Adult Non-Fluent Aphasia Therapy- in Kannada (MANAT-K, Venugopal & Goswami 2005) have been developed. These manuals have focused mainly on developing materials for therapy purposes, but have not been field tested. By using a field tested manual, speech language pathologists can provide better and effective rehabilitation for persons with aphasia. Hence, a need was felt to field test the Manual for Adult Non-Fluent Aphasia Therapy- in Kannada.

The Manual for Adult Non-fluent Aphasia Therapy in Kannada (MANAT-K) consists of five broad domains. Therefore, the review of literature is discussed under the headings of these five domains- Functional communication, repetition, comprehension and expression, naming reading and writing domain.

Functional communication domain

Functional communication problems in different areas like language, behavioral and physical skills lead to restrictions in social involvement. Consequences of difficulty in communication can impinge on their participation in society and may lead to social isolation, mental and emotional changes (behavioral problems like depression, apathy), problems in adjustments of

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interpersonal relations, lack of independence and failure to return to their workplace (Cruice, Worrall, Hickson & Murison, 2003).

Treatment should focus on "bridging language skills and adaptations into the real-life needs of the person with aphasia" (La Pointe, 2005). The treatment for aphasia by the speech-language pathologists often depend on the needs and preferences of persons with aphasia and their family members, the time (post-onset of stroke) and other variables which will vary from individual to individual. It is essential that the speech-language pathologist incorporate these tasks which are functional for each person with aphasia. For example, a bank employee may be given a word retrieval task which requires him to name various activities needed for his job.

Repetition domain

Repetition refers to the ability to reproduce patterns of familiar speech sounds from the auditory presentation. It is the most elementary mechanism at the core of spoken language. Goodglass and Kaplan (1983) reported that repetition phenomenon in persons with aphasia could be distributed at three points in the process- may fail at the level of recognition or, may fail to grasp the sounds as words, failure at the level of articulation in spite of a person's ability to demonstrate that the person knows the meaning of the test word and finally failure due to selective disassociation between auditory input and speech output system.

Comprehension and Expression domain

It is observed that the auditory comprehension is better preserved in persons with non-fluent aphasia in comparison to the fluent type. Comprehension is relatively better than the verbal output. Comprehension deficits in persons with non-fluent aphasia can range from difficulty in comprehending a specific sequence of commands, pointing to a serially named object/picture. They might often have difficulty in understanding of syntactic structures and words omitted in the verbal output are difficult to comprehend Caplan and Hildebrandt (as cited in Benson & Ardila, 1996). Comprehension of spoken language is usually considered to be good in persons with transcortical motor aphasia at least at the level of routine conversation. There might be some difficulty in complex material and relational words Rothi and Heilman, (as cited in Benson & Ardila, 1996). Similar reports of obvious comprehension and expression deficits have been stated by Caramazza, Capasso, Capitani and Miceli (2005), Goodglass and Berko (as cited in Benson & Ardila, 1996), Hence, it was important to incorporate the various activities to improve the auditory comprehension skills.

Naming domain

Naming is a major speech production target for most persons with aphasia. Hence, treatment for naming deficits depends on the type of errors presented by a person with aphasia. Generally, persons with frontal lobe lesions including the Broca's area present with word production anomia. This type results from motor problems that are consequence of the anterior lesions. This type of word production anomia is further classified into several types. *Articulatory reduction anomia* is most commonly found in persons with Broca's aphasia. Due to the reduction in articulatory competency, naming problems arise which is characterized by deletion of syllables in clusters and phonemic assimilation.

Howard, Patterson, Franklin, Orchard-Lisle, and Morton (1985 b) conducted a study on 12 persons with acquired aphasia who demonstrated word-finding deficits. They compared the effect of two therapy techniques in the treatment of picture naming deficits. The two therapy techniques were semantically and phonologically-based treatments and each participant took part in both types of treatments. The participants, for each technique, either attended four sessions per week or eight sessions per two weeks. Results indicated that after one week following the end of the treatment, significant amount of improvement was reported for semantic therap. The researchers attributed this to the improvement that generalized to the untreated items. They have concluded that precise and theoretically driven therapy methods will bring about significant improvement in the word retrieval abilities in persons with aphasia. Henaff Gonon, Bruckert and Michel (1989), Kiran and Bassetto (2008) have also emphasized the importance to improve naming deficits in persons with aphasia

Reading and writing domain

In persons with non-fluent aphasia reading deficits may present itself as a difficulty (often total failure) in reading aloud. Most of the persons with non-fluent aphasia (especially the Broca's aphasia) have difficulty in comprehending written material (as cited in Benson & Ardila, 1996). However, reading comprehension may be better preserved than reading aloud. On the other hand, persons with

transcortical motor aphasia both reading aloud and comprehension is better preserved than their writing skills. Also the reading comprehension is reported to be at near normal levels except for syntactically complex materials.

Reading and writing deficits may be more or less important for a person with aphasia. Hence, the clinician working to improve one's reading and writing skills should take in to consideration the pre-morbid literacy level, current need and interest in reading and writing.

To sum up, from the literature reports one can derive that the persons with aphasia exhibit deficits in various linguistic domains. Thus, it is of utmost importance that speech language pathologists plan activities using materials/ stimuli which are field tested and are directed to improve the skill deficit areas.

Method

The present study aimed at field testing the Manual for Adult Non-Fluent Aphasia Therapy-in Kannada (MANAT-K. A total of ten persons with non-fluent aphasia served as participants for the study. Persons with aphasia were identified through hospitals, neurological clinics and/ or speech and hearing institutes/centers. They were diagnosed using adapted version of Western Aphasia Battery in Kannada (Chengappa & Vijayashree, 2007) by experienced speech language pathologist. The age range of the participants ranged from 28-73 years with a mean age of 51.4 years. The non-fluent aphasia group consisted of one person with global aphasia, six persons with Broca's aphasia and three persons with trans-cortical motor aphasia. Participants were selected by adhering to the appropriate ethical procedures. Participants and the family members were explained about the purpose and procedures of the study, and an informed verbal and/or written consent was taken.

All participants were native speakers of Kannada and had aphasia following stroke and the lesion was confined to left hemisphere. There was no known history of pre-morbid neurological illness, psychiatric disorders and/or cognitive decline, and no other significant sensory and/or cognitive deficits. The demographic details of the participants are presented in Table 1.

Table 1: *Demographic details of persons with aphasia.*

Sl.No	Age (years)	Gender	Time Post Onset	Type of aphasia	Pre-morbid vocation
1	65	Male	Seven months	Global aphasia	Business
2	40	Male	Eight months	Broca's aphasia	Auto driver
3	28	Male	Three years	Broca's aphasia	Animation designer
4	52	Male	11 months	Broca's aphasia	Factory worker
5	56	Male	Four years	Trans-cortical motor aphasia	Bank employee
6	49	Male	Six months	Broca's aphasia	Bank employee
7	46	Male	Four months	Broca's aphasia	Daily wager
8	73	Male	Three months	Trans-cortical motor aphasia	Retired Sub-Inspector of Police
9	45	Male	Eight months	Broca's aphasia	Bus Driver
10	60	Male	One month	Trans-cortical motor aphasia	Group D employee

Procedure

The present study was carried out in two phases.

The phase I included reviewing the Manual for Adult Non-fluent Aphasia Treatment in Kannada (MANAT-K). This manual was developed by Venugopal and Goswami (2004). Phase II included the field testing of the MANAT-K. In this phase persons with non-fluent aphasia were given treatment using this manual. Each participant attended a total of 15 speech and language therapy sessions, each session lasting for duration of 45 minutes.

Phase I: Modification of the Manual: Preparation of stimuli

Manual for Adult Non-fluent Aphasia Treatment in Kannada (MANAT-K) by Venugopal and Goswami (2004) was reviewed. After reviewing MANAT-K (2004), the documented principles and guidelines prescribed in the literature for the treatment of persons with non-fluent aphasia were compiled and organized. The illustrations of various activities in the different domains were based on the principles of aphasia management. The activities of each sub-section have been arranged in hierarchical order along with its stimulus and response mode hierarchy. Scoring pattern and progress criteria are provided in the beginning of each sub-section. Overall progress criterion is also provided for each domain and its sub-sections. The following broad domains were finalized-Functional communication (FC), repetition (R), comprehension and expression (C&E), naming (N) and reading and writing (R&W). Each of these domains is further sub-divided into several sub-sections.

Table 2: *Responses of the judges regarding the manual.*

Sl. No	Parameters	Very Poor	Poor	Fair	Good	Excellent
1	Simplicity			1	9	2
2	Familiarity			2	7	3
3	Size of the picture			2	5	5
4	Color and appearance			5	2	5
5	Arrangement			4	5	3
6	Presentation		2	2	8	
7	Volume			3	8	1
8	Relevancy				9	3
9	Complexity			3	7	2
10	Iconicity			5	6	1
11	Accessibility			4	6	2
12	Flexibility				8	4
13	Trainability			1	4	7
14	Stimulability			1	7	4
15	Feasibility			1	8	3
16	Generalization		2	3	4	3
17	Scope of practice			2	6	4
18	Scoring Pattern			7	3	2
19	Publications, Outcomes and Developers (professional background) *	Yes No	2 10			
20	Coverage of parameters (Reception and expression)			1	9	2

**The SLPs were asked to rate this parameter in terms of "Yes" or "No"*

Stimuli and activities incorporated in MANAT-K under the above mentioned sections were framed keeping in mind the semanticity, familiarity and usage. Appropriate picture stimuli wherever necessary for the manual were drawn by a professional artist. A feedback rating questionnaire (Appendix I) was developed containing 20 parameters, consisting of a 5-point rating scale in order to rate the stimuli and activities illustrated in the various sub-sections of modified MANAT-K. Twelve Speech Language Pathologists (SLPs) who were native speakers of Kannada were asked to judge the manual based on this feedback questionnaire. The responses of the judges about the manual are shown in Table 2.

There were few other suggestions given by the SLPs regarding the correction of syntactic structures/sentence formation to be followed in Kannada, clarity and color of the topic representation in the picture stimuli, arrangement of stimuli in random order under the "tenses" section of "syntax level". The suggestions given by the judges were incorporated and a final form of MANAT-K was prepared.

Additionally, to get a feedback about the expediency of the manual from the caregivers of the participants, a feedback questionnaire was developed. This questionnaire was distributed to them at the end of the 15th therapy session.

Phase II: Field testing

In phase II, the field testing of MANAT-K was carried out. Ten persons with different types of non-fluent aphasia (one-global; six-Broca's and three-trans-cortical motor aphasia) were subjected to MANAT-K. Using this manual, speech-language therapy was given by a speech language pathologist for 15 sessions each session lasting for duration of 45 minutes. Though the total participants were ten, but all of them were not subjected to all the domains, as few persons with aphasia performances were very poor mainly for naming and repetition skills. Thus, in few domains of MANAT-K, the participants number was less than ten.

However, during the speech language therapy sessions, a need was felt to incorporate tailor made activities for each person with non-fluent aphasia, since the group was heterogeneous in nature. Hence, additional activities were integrated in the manual to provide a broader view keeping in mind some other deficits. These included treatment for Apraxia of Speech (AOS) - Eight Step Continuum (Rosenbek et al. 1973), Oro-motor exercises, written alphabet and word cards (for each stimulus) and individual picture cards

Response and recording

Each session of speech language therapy was video recorded. The video recorded sample was analyzed for the number of correct, partial/intelligible and incorrect/no responses for each participant in different sub-sections of MANAT-K. A score of '1', '1/2' 'and '0' was given for every correct, partial/intelligible and incorrect/no responses respectively. The raw scores of each participant for different activities were converted to percentage. Further these scores were subjected to statistical analysis using SPSS software (version16.0) package.

Results

The findings of the present study based on the statistical analysis have been broadly presented under the following headings:

Quantitative analysis of performances by all persons with non-fluent aphasia (N=10) across various domains

a) Comparison of performances of persons with non-fluent aphasia on functional communication (FC) domain for the pre, mid and post therapy sessions (i.e. 1st, 7th and 15th session)

The overall total scores were summed up for all the activities of the sub-sections under functional communication domain. The mean (M) and standard deviation (SD) for pre, mid and post therapy sessions were calculated for ten persons with non-fluent aphasia. Table 3 illustrates the mean and SD values for persons with non-fluent aphasia for functional communication domain.

Table 3: *Mean and SD values for persons with non-fluent aphasia for functional communication domain*

	Functional communication		
	Pre therapy session	Mid therapy session	Post therapy session
Mean (N=10)	53.01	62.32	71.27
SD	19.21	13.86	14.25

From Table 3, it can be seen that the ten participants scored an overall mean of 53.01 (SD =19.21), 62.32 (SD =13.86) and 71.27 (SD =14.25) in pre, mid and post therapy sessions respectively across the various sub-sections in functional communication domain.

Results showed that there was a difference in the performances in functional communication domain across the pre, mid and post therapy sessions as evident from the mean score values. As the mean score values differed across three sessions, the Friedman's test was carried out to identify any statistically significant difference in the pre, mid and post therapy sessions.

A significant difference was obtained in pre, mid and post therapy session $\{\chi^2 (2) = 19.54, p<0.01\}$, the data was further subjected to Wilcoxon signed rank test. Results of this test indicated a significant difference between pre and mid ($|z|= 2.66$, $p<0.01$); mid and post ($|z|= 2.81$, $p<0.01$) and pre and post ($|z|= 2.80$, $p<0.01$).

Thus, it is obvious from the results that the activities stated in manual have shown improvement in the communication skills at functional level in persons with non-fluent aphasia. The treatment for aphasia often depends on the needs and preferences of persons with aphasia and their family members which will vary from one person to the other. It is imperative that the speech-language pathologists incorporate tasks which are functional in nature, keeping in mind the assets of an individual with aphasia. For example, a bank employee may be given a word retrieval task which requires him to name various activities needed for his job. Evidence comes from the research work by La Pointe, 2005, who reported that treatment should focus on "bridging language skills and adaptations into the real-life needs of the person with aphasia". Thus, the activities mentioned under the functional domain of MANAT-K facilitate the persons with aphasia to relearn the activities of daily living and thereby enhancing a person's participation in communication. Therefore, indirectly or directly the communication skills which were lost in a person with aphasia can be strengthened using the various activities stated in the functional domain of MANAT-K, which inturn improves the quality of life. Researchers like Cruice, Worrall, Hickson and Murrison (2003) have reported that it is imperative that the skills of persons with aphasia in the area of language functioning, functional communication, emotional and social health, and physiological well being are critical aspects which professionals should consider while planning their rehabilitation program.

b) Comparison of performances of persons with non-fluent aphasia on repetition domain for the pre, mid and post therapy sessions (i.e. 1st, 7th and 15th session)

From Table 4, it can be seen that the ten participants scored a mean of 51.53 (SD =24.64), 60.17 (SD=23.05) and 63.36 (SD =20.40) in pre, mid and post therapy sessions respectively across the various sub-sections in functional communication domain.

It was observed that the results showed that there was significant difference in the mean scores. Therefore, the data was further analysed using Friedman's test. The results showed a significant difference in pre, mid and post therapy session $\{\chi^2 (2) =11.52, p<0.05\}$. No obvious difference between pre and mid and mid and post therapy sessions on Wilcoxon signed rank test. However, statistically significant difference of ($|z|= 2.66$, $p<0.01$) was evident in the pre and post therapy session on repetition domain of MANAT-K.

The results have clearly shown that activities under equivocal (yes/no), egocentric, automatic speech and environmental stimuli are arranged in such a way that appropriate responses from persons with non-fluent aphasia can be elicited and an improvement in the communication skills

Table 4: *Mean and SD values for persons with non-fluent aphasia for repetition domain.*

	Repetition		
	Pre therapy session	Mid therapy session	Post therapy session
Mean (N=9)	51.53	60.17	63.36
SD	24.64	23.05	20.40

becomes evident over a period of time. Though, typically repetition is an important aspect to improve the communication skills, these repetition tasks needs to be integrated with the activities involved in improving the auditory comprehension and expression. Further, repetition tasks juxtaposed with the traditional aphasia therapy techniques like Melodic Intonation Therapy, Context-based approach, Response elaboration technique etc. facilitate the sub-vocal rehearsals which inturn helps a person with non-fluent aphasia to monitor their comprehension and expressive skills. Thus, it can be stated that the activities mentioned under repetition tasks in MANAT-K does facilitate the verbal communication skills. Therefore, the activities in this task can either be carried out independently depending on the repetition skills of a person or can be integrated along with other tasks. Thus, the activities illustrated under this domain have shown that they are flexible enough to bring a change in the verbal output. This is evident from the performance of all the participants including the person with global aphasia.

c) Comparison of performances of persons with non-fluent aphasia on comprehension domain for the pre, mid and post therapy sessions (i.e. 1st, 7th and 15th session)

Table 5 illustrates the mean and SD values of the ten participants who scored a mean of 57.22 (SD =24.24), 63.95 (SD=23.26) and 65.11 (SD=20.19) in pre, mid and post therapy sessions respectively across the various sub-sections in comprehension domain.

The Friedman test was further carried out which revealed that there was no significant difference across pre, mid and post therapy sessions. The performances of all the participants with non-fluent aphasia across the various activities were not statistically significant, but the mean values did show a difference across the sessions. This indicates that persons with non-fluent aphasia did show an improvement in this domain which is relatively better in the post therapy sessions in

Table 5: *Mean and SD values for persons with non-fluent aphasia for comprehension domain.*

	Comprehension		
	Pre therapy session	Mid therapy session	Post therapy session
Mean (N=10)	57.22	63.95	65.11
SD	24.24	23.26	20.19

comparison to the pre therapy sessions. The improvement shown reflects that the activities illustrated in the manual did bring about a gradual and steady progress in this domain.

Evidence also comes from the research work done by Caramazza, Capasso, Capitani and Miceli, 2005 who reported that there seems to be no simple forms of impairment of comprehension in persons with Broca's aphasia and this they attributed to the variation of its comprehension level and large cognitive and linguistic heterogeneity in the task.

It is also proposed and advocated that using the present manual the clinician should present the stimulus with reduced rate, no background noise and with different types of cues (auditory, visual, gestural and orthographic) and gradually fading the cues as the therapy session progresses. For word comprehension, several variables can be manipulated to adjust difficulty. The lexical stimuli may be presented with the printed word. Redundant verbal context might help in identifying an object. Picture stimuli can be varied in semantic relatedness and can be supplemented with printed words. Therefore, the activities illustrated in the manual can also be varied for improving the comprehension of a person with non-fluent aphasia by manipulating the stimuli depending on the responses.

d) Comparison of performances of persons with non-fluent aphasia on expression domain for the pre, mid and post therapy sessions (i.e. 1st, 7th and 15th session)

The mean percentage values of the persons with non-fluent aphasia were compared across the pre, mid and post therapy sessions. The mean (M) and standard deviation (SD) were calculated by summing up the percentage scores obtained in the expression domain. These mean and SD values of are presented in Table 6. On this domain, the participants obtained a mean percentage of 49.06 (SD=16.77), 61.04 (SD=17.76), 63.12 (SD=14.20) respectively across the therapy sessions.

Table 6: *Mean and SD values for persons with non-fluent aphasia for expression domain.*

	Expression		
	Pre therapy session	Mid therapy session	Post therapy session
Mean (N=10)	49.06	61.04	63.12
SD	16.77	17.76	14.20

On the Friedman's test, it was observed that for all the 10 participants with non-fluent aphasia there was a significant difference [Pre-mid-post: $\{\chi^2 (2) = 15.80, p<0.05\}$] through the 1st, 7th and 15th sessions in the performance of expressive skills. Further Wilcoxon signed rank test revealed significant difference ($|z|= 2.80$, $p<0.01$) for pre and mid sessions and ($|z|= 2.80$, $p<0.01$) for pre and post therapy sessions. There was no statistically significant difference seen for mid and post therapy sessions. On the expression domain, all the participants showed substantial improvement from 1st to the 15th therapy sessions. This shows that the manual covers a wide range of activities which are framed to elicit the non-verbal as well as verbal responses from persons with non-fluent aphasia.

e) Comparison of performances of persons with non-fluent aphasia on naming domain for the pre, mid and post therapy sessions (i.e. 1st, 7th and 15th session)

The overall total mean percentage scores was obtained by compiling the percentage scores on different sub-sections for the naming domain for seven participants in the pre, mid and post sessions.

Table 7: *Mean and SD values for persons with non-fluent aphasia for naming domain.*

	Naming		
	Pre therapy session	Mid therapy session	Post therapy session
Mean (N=7)	50.59	56.91	63.32
SD	14.56	16.45	14.88

The overall mean scores achieved by the seven participants are presented in Table 7. The participants for the pre, mid and post therapy sessions obtained a score of 50.59 (SD=14.56), 56.91 (SD=16.45) and 63.32 (SD=14.88) correspondingly. Thus, the result showed a gradual trend in naming abilities of the participants from 1st to 15th session. This was supported by the findings of Friedman's test where a significant difference $\{\chi^2 (2) =10.28, p<0.01\}$ was revealed. Subsequently the data was analyzed using Wilcoxon signed rank test which also showed a significant difference for pre and post and mid and post therapy sessions with ($|z|= 2.36$, $p<0.05$) and ($|z|= 2.02$, $p<0.05$) respectively. However, for the pre and mid sessions there was no significant difference. The results in this domain showed that there was an improvement in naming abilities in the 15th session in persons with Non-fluent aphasia. This typifies that the activities presented in the manual are stimulable for eliciting responses for the naming tasks. The stimulus presentation moved in hierarchy i.e. category specific to general naming.

Cueing strategies provided to the participants were also faded as the sessions progressed. This reveals that systematic presentation of stimuli and use of appropriate cueing techniques helps persons with non-fluent aphasia to improve their naming abilities. Also working on naming skills in persons with aphasia augments comprehension and expression abilities which in turn help the person to communicate better. This finding is in agreement from the study by researchers like Howard, Patterson, Franklin, Orchard-Lisle and Morton (1985b) and Horton and Byng (2000) who reported that the semantic therapy for anomia is well established both in research and in clinical practice. In addition, for the participant 8 and 10 orthographic cues were provided to elicit responses on the naming tasks, since sight-word reading was well preserved. This finding is in accord with the research report by Henaff Gonon, Bruckert and Michel (1989); Best, Hickin, Herbert, Howard and Osborne (2000) who have reported that orthographic cues have been proven to be effective in facilitating naming by persons with aphasia. Among the facilitation techniques used, the phonemic cue has been generally found to be the most efficacious, but its facilitating effect is short-lived (Patterson, Purell & Morton, 1983).

f) Comparison of performances of persons with non-fluent aphasia on reading and writing domain for the pre, mid and post therapy sessions (i.e. 1st, 7th and 15th session)

As the number of participants who were subjected to MANAT-K on the domain of reading and writing were limited (N=2), the data could not be analyzed using any objective statistical tests, the mean percentage score were calculated. It was observed that the mean percentage scores for participant 8 were 66.70, 65.00 and 67.13 for pre, mid and post therapy sessions respectively. For the 10th participant in the pre and mid therapy sessions the mean percentage scores were 71.67 and 79.76 respectively.

It was obvious that the activities taken up enhanced the reading and writing abilities, though the activities mentioned in the manual are very basic and focuses on day-to-day usage of such reading, writing and arithmetic skills.

Quantitative analysis of overall communication abilities in persons with non-fluent aphasia

The data collected from all the ten participants for the various domains on MANAT-K across pre, mid and post therapy sessions (1st, 7th and 15th) were summed up and analyzed and represented in the Table 8. The overall mean and standard deviation achieved by the persons with non fluent aphasia are 53.04 (SD=18.79), 60.50 (SD=16.67) and 64.37 (SD=14.69) for 1st, 7th and 15th therapy sessions respectively

Table 8: *Mean and SD values for overall communication skills in persons with non-fluent aphasia for various domains in MANAT-K across pre, mid and post therapy sessions.*

	Overall communication skills		
	Pre therapy session	Mid therapy session	Post therapy session
Mean (N=10)	53.04	60.50	64.37
SD	18.79	16.67	14.69

It is evident that there was a significant progress in the performance of the participants in overall communication skills as the therapy sessions moved from 1st to 15th. Non-parametric statistical analysis (Friedman's test) did reveal a significant difference [pre-mid-post: $\{\chi^2 (2) = 14.60, p<0.05\}$], in the attainment of overall communication by non fluent aphasia. The Wilcoxon Signed Rank Test was further carried out which revealed a significant difference across pre-mid ($|z|= 2.49$, $p<0.05$), mid-post ($|z|= 2.39$, $p<0.05$) and pre-post ($|z|= 2.80$, $p<0.05$) therapy sessions.

It is also evident from the results that the person with global aphasia also showed obvious improvement in overall communication skills across the sessions. Hence, it can be stated that using MANAT-K, there was a noticeable trend in terms of improvement in overall communication skills of persons with non-fluent aphasia. This improvement was evident when the performances of the participants were compared for their performances across the various domains over the sessions.

This shows that MANAT-K paves way for speech-language pathologists to carry out the activities in a more methodological manner. The activities exemplified in the different sub-sections of the domains provide scope for flexibility and can be used by the clinicians at ease. The clinicians can use this manual along with the traditional therapy techniques used for enhancing communication abilities in persons with non-fluent aphasia. Further, it is also advocated in the manual that the cues play the role of catalyst and if used adequately and appropriately, will bring about the desired responses from persons with non-fluent aphasia hence making the clinical use of the manual more effective. Apart from the use of cues to elicit the responses from persons with non-fluent aphasia, there is also a provision to use other strategies such as vocal/sub-vocal rehearsals, self-correction, repetition, rephrasing, rate of stimulus presentation and speaking. Also using this manual appropriate feedback can be given for the person with non-fluent aphasia and also to their caregivers.

The sub-sections of the different domains cover a series of activities which can be carried out by the clinicians to fortify a wide range of responses from the persons with non-fluent aphasia. This manual also caters the needs of a person with aphasia whose verbal output is minimal (E.g.persons with global aphasia). Moreover, the strategies used in this manual also give way for the persons with non-fluent aphasia either to restore or compensate the lost communication skills. This view receives support from researchers namely Beukelman, Fager, Ball and Dietz, 2007.

Qualitative analysis of the clinicians' and care-givers' responses about the overall effectiveness of the treatment manual.

The 12 speech-language pathologists (SLPs) who rated the manual based on a feedback questionnaire as shown in Table 9. It is evident from the Table 9 that the two professionals rated the manual as "excellent" on the simplicity, complexity, accessibility scoring pattern and coverage of parameters. Familiarity, arrangement, relevance, feasibility and generalization were rated as "excellent" by three SLPs. The size of picture, color and appearance were rated as excellent by five SLPs. One professional rated the volume and iconicity parameter as "excellent". Flexibility, stimulability and scope of practice were graded as "excellent" by three professionals. Highest number (7) of SLPs rated the manual as "excellent" in terms of trainability.

Table 9: *Responses of the judges regarding the manual*

Sl. No	Parameters	Very Poor	Poor	Fair	Good	Excellent
1	Simplicity			1	9	2
2	Familiarity			2	7	3
3	Size of the picture			2	5	5
4	Color and appearance			5	2	5
5	Arrangement			4	5	3
6	Presentation		2	2	8	
7	Volume			3	8	1
8	Relevance				9	3
9	Complexity			3	7	2
10	Iconicity			5	6	1
11	Accessibility			4	6	2
12	Flexibility				8	4
13	Trainability			1	4	7
14	Stimulability			1	7	4
15	Feasibility			1	8	3
16	Generalization		2	3	4	3
17	Scope of practice			2	6	4
18	Scoring Pattern			7	3	2
19	Publications, Outcomes and Developers (professional background) *	Yes	2			
		No	10			
20	Coverage of parameters (Reception and expression)			1	9	2

**The SLPs were asked to rate this parameter in terms of "Yes" or "No*

Nine judges rated as "good" grade for simplicity, Relevance and coverage of parameters. Seven SLPs rated as "good" for familiarity, complexity and stimulability parameters. Five professionals rated as "good" on the size of the picture and arrangement parameters. Two professionals reported that the color and appearance were "good" in this manual. Eight SLPs judged the manual to be "good" on the presentation, volume, flexibility and feasibility parameters. Six judges rated the manual as "good" on iconicity, accessibility and scope of practice parameters. Trainability and generalization was rated as "good" by four judges. Three judges rated the scoring pattern as "good".

One professional rated the manual as "fair" on the simplicity, trainability, stimulability, feasibility and coverage of parameters. Two judges rated the familiarity, size of pictures, presentation and scope of practice parameters as "fair". Color and appearance, iconicity was rated as "fair" by five judges. Four SLPs rated the arrangement and accessibility as "fair". One judge rated the trainability, stimulability and feasibility and coverage of parameters as "fair". The rating "fair" was given by seven judges on scoring pattern parameter. However, only two professionals rated the presentation and generalization parameters as "poor". Also for the publications, outcomes and developers (professional background) domain, two professionals reported that they were aware of other materials available which can be used for improving language skills in persons with aphasia (i.e. UNICEF cards), and ten professionals stated that they were not aware of any other manuals available either in the Western or Indian contexts. Though, two professionals reported that UNICEF cards are available, these cards are not exclusively meant for persons with aphasia.

Consequently, it can be stated that this manual received grading ranging from excellent, good or fair from most of the judges. Therefore, the professionals were of the opinion that this manual can be used effectively on persons with non-fluent aphasia.

The caregivers of the persons with non-fluent aphasia were asked to give a feedback of the manual regarding its effectiveness on 10 parameters. It can be seen from the Table 10 that most of the caregivers rated the manual as "frequently" in the parameters listed, while few caregivers rated the manual as "most of the time" on the various parameters. All the caregivers stated that they were not using any other material to improve the communication skills for them.

Table 10: *Responses of the caregivers about the expediency of the manual MANAT-K.*

SL No	Parameters	Not at all	Sometimes	Frequently	Most of the time
1	Does this manual provide support and confidence to carry out activities at home?			8	2
2	Do you feel whether the activities in the manual are helpful and flexible to improve communication?			8	2
3	Does the manual provide better understanding of the ongoing treatment communication process?			9	1
4	Are the activities given in the manual in each section useful in different situations?			8	2
5	Are the activities and related items used in the manual familiar?			10	
6	Does the manual contain appropriate number of stimuli in each section?			7	3
7	Whether the picture stimuli are easily recognizable and representational?			9	1
8	Whether the manual is user-friendly and trainable?			10	
9	Whether the amount of effort and time involved in rehabilitation is satisfactory?			10	
10	Are you using any other training material(s) of the same kind? If yes how the materials used are different from each other?	10			

It can be inferred from the results that the feedback given by the speech-language pathologists ranged from "fair" to "excellent" about the manual. This reveals that professionals opined that this manual has good scope in terms of improving the communication skills in persons with non-fluent aphasia. Similarly the ratings from the caregivers of the participants indicated that the overall utility of the manual ranged from "frequently" to "most of the time" from the results. This shows that the caregivers found this manual quite useful bringing about an enhancement in communication skills.

Summary and Conclusions

The field tested results have shown that all the 10 persons with non-fluent aphasia did show improvement on various domains i.e. functional communication, repetition, comprehension, expression, naming, reading and writing. The improvement shown by persons with non-fluent aphasia reflects that this manual helps in improving various communication skills. The stimuli presented in the manual have been field tested and thus has proved to be effective in the management of persons with non-fluent aphasia. Furthermore, it is also evident from the results that this manual is quite effective in eliciting responses even in persons with minimal/no verbal responses. Since the manual covers a wide range of activities covering different domains to improve linguistic skills, it provides scope for flexibility and the speech language pathologists can carry out the activities to elicit maximum responses from the person with non-fluent aphasia. Also, using this manual suitable feedback can be given to persons with non-fluent aphasia and also to their caregivers. In addition, it is emphasized to use this manual along with various traditional therapy techniques, appropriate cueing strategies as stated in the manual can bring about a difference in the communication skills in persons with non-fluent aphasia.

By using this field tested manual, it is expected that speech language pathologists can be provide better and effective rehabilitation for persons with aphasia. MANAT- K is quite handy for speech language pathologists who face the problem of using appropriate activities for improving various communication skills in persons with aphasia. This will facilitate the professionals in documentation of activities and responses in a scientific manner and make way for a better evidence based practice.

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