Treatment Manual in English for Indian Children with Dyslexia

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Abstract

Dyslexia refers to difficulty in the acquisition of literacy skills that may be caused by a combination of phonological processing, visual and auditory processing difficulties. Management issues of these children with dyslexia have always been a challenge for the speech and language therapist. Though many treatment strategies have been discussed and their efficacy reported in literature, not many attempts have been made at training the Indian children. The present study thus aimed at developing a manual in English of Indian Children with Dyslexia (CWD) and also field testing the same. Such a focus of intervention would help the children tackle the difficulties they face in their second language at school level. The study initially involved the development of the treatment manual. The manual consisted of four sections namely listening comprehension, phonological awareness, reading skills and reading comprehension. This therapeutic intervention was carried out for four children with dyslexia for 10 sessions. Pre-therapy scores of these children on the skills worked upon were compared to post-therapy scores. Results revealed improvement in all the domains which were worked upon though not statistically significant. Participant 1 (D1) and D2 showed greater improvement across all domains worked upon. This study thus brings light into the domains which need to be incorporated when dealing with the therapeutic intervention of children with dyslexia. However generalization issues still needs to be addressed.

Key words: treatment manual, dyslexia, phonological awareness, intervention

Dyslexia is a term that has been loosely applied to reading disabilities. Specific definitions for dyslexia vary with disciplines. Dyslexia refers to difficulty in the acquisition of literacy skills that may be caused by combination of phonological processing, visual and auditory processing difficulties. One of the most daunting and clearly defined current challenges for both researchers and Speech-Language Pathologists is to develop, disseminate and implement methods for training children on reading skills. Existing research related to the treatment trends available till now is briefly explained in the following sections.

While considering remediation for children with dyslexia, phonological awareness training is found to be the most discussed in literature. Phonological awareness is a metalinguistic ability which enables the child to analyze the sound structure of language. Many studies have been conducted in the western setting indicating significant improvement in decoding and word reading accuracy, though generalization remained a question. In the Indian context, Shilpashree (2004) found that training of meta-phonological skills in Kannada speaking children also showed improved reading abilities in that language. Auditory training has also been applied in treating children with dyslexia as they are thought to have difficulty processing auditory information. Perfetti (2007) reported improvement in reading abilities of six children with dyslexia with a combined auditory and articulatory training. Auditory temporal processing could be trained effectively at the sound and phoneme levels. However, no significant stable transfer of these improved abilities on reading and spelling exceeding the effect of the school-based standard training was demonstrated.

Reading fluency is another aspect which has received immense attention recently. Recent researchers opine this skill to be important in determining the overall reading efficiency. For reading, fluency speed and accuracy have been traditionally considered the hallmark or most essential features used to describe the measure and interpret fluency (LaBerg & Samuels, 1974). Researchers also suggest that accuracy in itself is not sufficient because for complete understanding of any given text, reading should be rapid enough to understand the connections between the printed ideas (Nathan & Stanovich, 1991). These research reports thus emphasize the importance of rate for fluent reading and also for better comprehension. Reading rate in turn depends upon the purpose of reading as stated in the theory of reading (Carver, 1992). He mentioned 5 important gears of reading which makes explicit predictions about the skill which needs to be emphasized depending upon the purpose of reading. 5 gears include scanning, skimming, raiding, reading to learn and reading to memorize. Reading fluency involves various strategies which have been reported in the literature. Many studies have been carried out to find the efficacy of these strategies.

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Repeated reading is one of the oldest adapted strategies by most clinician while working at improving reading fluency (Rose, 1984; Rashotte & Torgesen, 1985; Cohen, 1988; Daly & Martens, 1994; Marston, Deno, Dongil, Diment & Rogers, 1995; Swain & Allinder, 1996). Repeated reading with modeling (adult, proficient peer or computer) was also adapted a little later, found to be more efficient and effective than reading repeatedly alone (Gilbert, Williams & McLaughlin, 1986; Moseley, 1993; Daly & Martens, 1994; Vaughn, Chard, Bryant, Coleman, Tyler, Thompson & Kouzekanani, 2000).

Reading comprehension is often limited in children with reading disabilities because of difficulties with accurate and fluent word recognition, and because they have missed opportunities to acquire reading comprehension strategies (Brown, Palincsar & Purcell, 1986). Hence, strategies like making use of contexts to comprehend, making inferences, visualization of the material being read etc. which have proven to be effective with children with dyslexia needs to be focused to attain a complete and efficient management outcome. For any remediation program for reading disability to attain completion reading fluency and automaticity needs to be achieved at the end of the program. Various approaches are available to treating the reading difficulties. As discussed earlier one approach would focus only on intense training on word reading and related phonological processing skills (Vellutino, Scanlon, Sipay, Small, Pratt, Chen & Denkla, 1996; Torgesen, Rashotte & Alexander 1997; Foorman, Francis, Fletcher, Schatschneider & Mehta, 1998; Vadasy, Jenkins & Pool, 2000) other being the one involving primary focus on training reading comprehension strategies (Englert, Tarrant, Mariage & Oxer, 1994). Yet another approach involves a combination of word reading and comprehension instruction (Iverson, Tunmer & Chapman, 2005). None of these approaches are mutually exclusive though. When working with reading comprehension, inferential thinking is one skill that is a major predictor of one's reading ability because it is known to play an important role in understanding and integrating texts (McKoon & Ratcliff, 1992; Graesser, Singer & Trabasso, 1994; Kucan & Beck, 1997). Most children who have relatively normal reading abilities are found to have more difficulty at answering inferential questions when compared to literal questions.

Though such wide range of research review is available discussing the various methods of treating children with dyslexia, most of the above mentioned studies holds good only for those children being rehabilitated in L1 which is relatively implicit. The dyslexia instruction becomes much more challenged when the treatment needs to be given in L2 which is explicitly learnt by child in school settings. As mentioned by Gersten et al., (2001) many additional issues such as cultural acceptance and so on needs to be addressed when treating children who are English learners as in Indian setting. Studies reporting the efficacy of treating second language are very scanty and needs to be investigated in depth. Studies need to be carried out in children with English as L2 in determining how efficient the above mentioned treatment strategies and approaches are when dealing with a child acquiring the language. Children with English as second language may require intense instruction similar to low achievers owing to the differences in the orthography of Indian languages in comparison to English. And with intense training in English language Indian children may be benefitted when culturally appropriate materials are made use and also when native language is strategically used to teach the overcome the complexities with English. Such an approach in turn would not require exemption of English language for these CWD in India which is now being done to tackle the difficulty with the language. Henceforth an attempt to provide an intense instruction and thereby helping those children with the potential to learn to overcome the language difficulties needs to be taken up rather than blindly exempting them from this opportunity.

The aim of this study was to develop a treatment manual in English for Indian children with dyslexia which is culturally appropriate and also incorporate the rules of the language which may not be explicitly taught to these children in school settings.

Method

Participants: Participants included children with Learning Disability (in the age range of 11-13 years) from Grades V and VI. This clinical group consisted of 3 males and one female. None of the children enrolled for treatment had any known or reported history of hearing, neurological, developmental or emotional problems.

Subject selection criteria: All the children with learning disability (CWLD) were diagnosed on the Test of Early Reading Skills (Loomba, 1995). Native language of all the participants was Kannada with English as the medium of instruction in school. All the participants were assessed by a clinical psychologist for their intelligence reported average or above average

intelligence in the children. All these children were enrolled for speech-language intervention.

Development of the treatment manual: The manual was prepared incorporating four domains of treatment explained below. Materials and activities were taken from various textbooks, internet resources and journals. Each of the above mentioned domains had several other sub sections arranged in the hierarchical order of difficulty.

Criteria: On attaining a 90% criteria (in phonological awareness, phonics) and 85% (in reading comprehension, and listening comprehension) the subject could advance to the next level of the corresponding section.

Section 1: Listening comprehension skills: This domain consists of the following sub-sections.

Literal comprehension- This includes questions seeking the information directly stated in the passage played/read.

Missing information- This includes listening material with few of the content words missing, which the child is required to arrive at.

Inferential information- The child was made to inference new information which is unstated in the listening sample played/read.

Scoring: Each section consisted of listening passage accompanied with questions. Each question was awarded a score of '1' if answered correctly and '0' if not correct.

Section 2: Phonological awareness skills: Word recognition is considered to be important process in reading and usually emerges in the initial stages of reading acquisition. For proper decoding and access to the appropriate semantic component word recognition requires to be adequate. This domain consisted of the following sub-skills:

Pre-phonemic skills- This consisted of activities like counting the number of words in a given sentence, counting the number of syllables in a given word, judging a pair of words for similarity, choosing the odd one from a set of rhyming words, etc.

Phonemic awareness skills- This is considered to be deep phonological awareness requiring manipulation tasks such as consists manipulation activities like phoneme segmentation, onset-rime blending etc. This skill consisted of the following activities, onset-rime blending, onset-rime segmenting, phoneme blending, phoneme segmenting, phoneme addition, phoneme deletion and phoneme substitution.

Section 3: Reading skills: This section consisted of skills beginning from recognition of letter names and sounds (phonics), sight word recognition and reading fluency.

Phonics: Phonics involved activities aimed at establishing letter-sound knowledge. These skills involved learning about the letter sounds and their relationship to words. These instructions were included once the child familiarizes with the alphabets.

Sight word recognition: Sight word reading in the present manual involved the game Bingo where fast identification of words are facilitated by imposing a time limit for recognizing the word and also for producing it. This section involved activities promoting sight-word reading. Accuracy and the speed of processing the word were focused by providing feedback to the child.

Reading fluency: Reading fluency consisted of strategies for improving the fluency of reading. The activities included teaching sight word reading and reading using strategies like repeated reading with feedback/modeling, rereading with timing and listening preview. In the present study reading fluency consisted of strategies namely repeated reading, listening preview and re-reading with time. This section consisted of a graph for plotting the reading rate in each session. Accuracy and rate measures were obtained in this section.

Section 4- Reading comprehension skills: This domain involved various strategies which need to be incorporated in order for better comprehension of the material read. The strategies mentioned below were to be worked out in parallel most of the times when reading any material; hence there was no specific order of teaching them. The following were the strategies incorporated in the manual for facilitating better comprehension.

Fix it up strategy- This strategy helps to teach the child chunking any unknown word into parts and arriving at its pronunciation by chunking into parts similar to already known words and trying to sound them out the same way or just by chunking and trying to sound it out using the known phonetic rules of English.

Retell and summarize- Retell and summary involved various steps to help the child retell any given story retaining three important aspects required namely, the facts of the given story, the sequence and the meaning using the retelling cards and graphic organizers. This strategy has been reported to be effective instruction strategy and its long term influence on reading has also been emphasized.

Coding: Coding involved teaching the child to code the important portions of the text, the main ideas, the words which were not understood, events in the text which the child can connect to his earlier experiences, and also concepts new to him/her again using coding cards.

Connect: Connect involved training the child to associate any read material to his own real life experiences wherever applicable.

Referencing and inference strategy: Inferencing is often considered to be more complex to literal interpretation and hence also helps in greater thought process following reading. This skill teaches the child to infer information which is not given in the text and generate new ideas. It also helps in improving referencing the text which leads to such an inference which ultimately results in better understanding of the material read.

Graphic Organizers: Story mapping, KWL strategy (K- what we know, W- what we want to know, L- what you have learned): is a strategy used when reading expository texts. This teaches the child to link the already known information with the newly learnt one. Graphic organizers are considered strategies of content enhancement which have been proven to be efficient.

Administration of the manual: A 10 session treatment was planned and carried out for four Dyslexic children using the above prepared manual and pre and post test measures of various reading skills of these children was also obtained.

Procedure: Before enrolling the subjects for therapy a Pre-therapy evaluation was done using Test of Early Reading Skill (Loomba, 1995). The subjects were given an intense reading training for 10 sessions of 60 minute duration. In each of the sessions the skills taken up were, listening comprehension, phonological awareness and word recognition, reading comprehension, and reading fluency. The progression from one activity to the next was done only after attaining 90% accuracy.

Treatment manual included training listening comprehension, phonological awareness and word recognition, reading fluency, reading comprehension. This therapeutic intervention was carried out on a daily basis for 10 days for all the four participants. Before beginning each session a baseline measure of all the skills to be worked upon was obtained, and similar measures were also obtained post session on a daily basis. After 10 sessions of therapy a post therapeutic assessment was carried out by administering Early Reading Skill. The obtained measure was subjected to statistical analysis and the results discussed in the following sections.

Scoring and analysis: Baseline and post therapy scores for pre-phonemic, phonemic and fluency measures were obtained. For reading comprehension and listening comprehension scores were obtained however the data was more qualitative with the emphasis on strategies used for each child than the scores. The raw scores were averaged and percentage calculated for all averaged scores. Baseline and post therapy comparison after ten sessions was made for pre-phonemic and phonemic level skills using Wilcoxon Signed Rank test to determine the significance. Graphs were also plotted to show the trend in other domains (fluency, comprehension) with each session. Qualitative analysis was done for all other domains owing to the small sample size.

Results and Discussion

The present study primarily aimed to develop a treatment manual for children with dyslexia (CWD). Non-parametric test was employed along with Wilcoxon Signed Rank test as the sample size (N=4) was small in the present study. Wilcoxon Signed Rank test was used to compare the baseline and post-therapy scores and to check for its significance. For all the domains baseline and post-therapy scores were obtained and average scores were converted into percentage scores. The skills taken up for speech-language therapy included Listening Comprehension (LC) skills, Phonological Awareness (PA) skills, Reading Skills (RS) & Reading Comprehension (RC) skills. The results are presented and discussed under different sections.

Listening comprehension (LC) skill

To work on LC, activities related to literal comprehension, inferential comprehension and sequencing of main ideas were considered. Baseline and post-therapy scores for the entire domain were calculated and compared across participants. Scores shown under LC represent the scores of literal comprehension sub-skill as these were the skills

worked upon for all participants under this domain. Table 1 shows the average scores (in %) for baseline and post-therapy conditions for all the participants across all the domains.

From the Table 1 it is evident that the post therapy scores of all the participants for the LC domain were higher than the baseline scores. For LC domain only qualitative analysis and descriptive statistics were carried out. Inclusion of LC in the treatment for CWD has long been debated. Though no conclusive research reports are available, when considering the simple view of reading (Gough & Tunmer, 1986) verbal comprehension is considered to play a role in facilitating reading comprehension in addition to decoding and word recognition skills, however only general listening comprehension inclusion is supported by this simple view model. Simple view model (Gough et al., 1986) supported the inclusion of listening skills and also emphasized on the interaction between the components of reading namely comprehension and decoding in leading to overall reading skill.

This model has provided evidence for the multiplicative interaction of decoding and comprehension, thus suggesting that only when both skills are attained reading can occur effectively (Juel, Griffith & Gough, 1986; Stanovich, Nathan & Vala-Rossi, 1986).

Though many research reports support the involvement of speech perception deficit in CWD, (Bradley & Bryant, 1983) unequivocal reports on this notion are still lacking. Strategy used for literal comprehension, namely graphic organizer has been used by many researchers to facilitate reading comprehension by a means of text enhancement (Griffin, Simmons & Kame'enui, 1991; DiCecco & Gleason, 2002).

However owing to the similarity in reading comprehension and listening comprehension similar strategies like graphic organizers can be used in LC to facilitate content enhancement and thereby better comprehension. The same strategy was also used for RC domain for all the four participants of the study. Though graphic organizers have been reported to be efficient in facilitating semantic mapping, the extent to which it can be generalized to other contexts and with different materials are questionable (Kim, Vaughn, Wanzek & Wei, 2004).

Phonological awareness (PA) skill

To work on Phonological Awareness (PA), activities related to pre- phonemic awareness skills (PPAS) and phonemic awareness skills (PAS) were considered. Wilcoxon Signed Rank test was administered to compare baseline and post therapy

Table 1. *Average scores (in %) of all participants in baseline and post therapy conditions across all the domains*

Participants / Domains	Sub-sections	Sub-skills	D1		D2		D3		D4	
			Pre	Post	Pre	Post	Pre	Post	Pre	Post
Listening Comprehension (LC)			76.00	84.00	85.00	95.00	77.00	82.00	69.00	79.00
Phonological Awareness (PA)	PPAS	Y/N	76.00	90.00	91.00	95.00	85.00	91.00	31.00	47.00
		WM	80.00	93.00	89.00	96.00	63.00	76.00	26.00	41.00
		ODD	71.00	85.00	61.00	71.00	61.00	73.00	30.00	45.00
		RHYG	51.50	66.50	56.00	67.00	51.00	66.50	19.50	43.50
	PAS	ORB	51.00	81.00	59.00	77.00	56.00	70.00	42.00	58.00
		IPI	72.18	81.15	77.5	85.62	74.37	84.06	70.00	79.06
Reading Skills (RS)	PH	Rle	62.00	84.00	55.00	77.00	53.00	71.00	49.00	67.00
		Rlc	58.00	75.00	67.00	82.00	52.00	70.00	51.00	63.00
		LS	72.18	81.15	77.5	85.62	74.37	84.06	70.00	79.06
	RF	RT	32.00	42.00	49.00	69.00	25.00	33.00	17.00	23.00
		ACC	66.00	79.00	54.00	74.00	58.00	68.00	42.00	58.00
Reading comprehension (RC)		SP	66.00	85.00	72.00	87.00	49.00	54.00	44.00	57.00
		SS	74.00	89.00	78.00	87.00	63.00	82.00	69.00	74.00

Note: Participant 1 (D1), participant 2 (D2), participant 3 (D3), participant 4 (D4), pre-phonemic awareness skills (PPAS), phonemic awareness skills (PAS),yes/no (Y/N), word matching (WM), odd one out (ODD), rhyme generation (RHY-G), onset-rime blending (ORB), initial phoneme deletion (IPI), phonics (PH), reading fluency (RF), rule 'c' (Rlc), rule 'e' (Rle), letter sound (LS), rate (RT), accuracy (ACC), sentence puzzle (SP), story sequencing (SS), summarization (SUM).

scores on PPAS and PAS skills and to check for significance. Table 1 shows results on phonological awareness baseline established before therapy and post therapy scores for PA of all the participants.

As evident from Table 1 scores showed a general trend of improvement in the post-therapy scores in comparison to baseline scores across all participants. Wilcoxon Signed Rank test results revealed that there was no significant difference in the performance of subjects in baseline and post-therapy scores. There were variations in few of the activities across participants, though overall trend showed higher post-therapy scores.

To summarize the results of this domain, analysis of results revealed an improvement in post therapy scores following treatment. Baseline and post therapy scores were compared for each participant for all ten sessions on these four tasks under pre-phonological skills using Wilcoxon Signed Rank test which showed no significant difference. In addition to this qualitative analysis was also done which revealed some differences between baseline to post-therapy conditions. Results of the performance of individual participant suggested a similar trend to be evident in all of them across the tasks. The results in this section also revealed an easy acquisition of Y/N by three participants (D1, D2, & D3). WM was also found to be relatively easy for participants in comparison to other PAS tasks i.e. ODD and RHY-G. D4 also showed a similar trend in the scores irrespective of its poor baseline scores. In all the subjects, irrespective of the baseline levels an improvement in the post-therapy scores was observed.

The reason for no significant difference across baseline and post-therapy conditions in the tasks PPAS and PAS may be due to the lesser number of sessions taken up. Though no conclusive reports on the total duration and dosage of PA therapy is available in literature owing to the fewer studies on efficacy of PA, National Institute of Child Health and Human Development (NICHD, 2000a) has suggested 5 to 18 hours of instruction to bring about considerable improvement in phonological awareness skill, however this cannot be generalized because this criterion was not established taking the heterogeneity of the reading performances of children into consideration. Bailet, Repper, Piasta and Murphy (2009) reported an intense instruction on PA of 30 minute long session for 9 weeks to show some improvement on overall literacy skills. Considering the durations specified in the literature the duration of PA therapy provided in the current study (15 minutes approx for 10 sessions) is suggestive to be insufficient (Torgesen, Wagner & Rashotte, 1999).

Inclusion of PA in CWD has been emphasized by researchers since ages together and is not a new finding; however with respect to older children deep phonemic awareness or PAS in the present study are considered to be of more significance in bringing change in the reading skills. PPAS only facilitates the development of PA and has no direct contribution to the acquisition of reading skills. It is PA which helps children to develop the alphabetic principle, the basic concept of phonemes of the language etc. Hence with respect to older children PAS is more concentrated in therapy than PPAS. Effectiveness of phonemic awareness intervention in older children with dyslexia and specifically for bilingual children having English as their second language has been emphasized by the findings of Swanson, Hodson and Aikins (2005), in their study on Spanish-English older bilingual children (7^{th} grade). This would support the inclusion of these skills in the intervention of the participants of the present study (5^{th} and 6^{th} grade). Though not significantly deviant, the improvement in IPI of PAS was found to be lesser in comparison to ORB, this was because the scores of children went down in IPI task as most of them produced initial syllables instead of phonemes which was scored as incorrect and hence the overall improvement came down. Participants of the study tended to produce syllables in IPI task owing to some amount of cross-linguistic influence which needs to be addressed in the intervention of these children. Indian languages are syllabic and hence children find syllabification much easier. English in turn is considered to be a phonemic language, with phonemes forming the minimal units. Thus when dealing with ELL as in the case of Indian children, intervention should incorporate all the basic principles of the language since the language for ELL would be learnt explicitly unlike native speakers.

Reading skills

To work on Reading Skills (RS), activities for improving phonics (PH), word recognition (WR) and reading fluency (RF) were considered. As shown in Table 1 phonics (PH) showed improvement in general following therapy in all the participants. From the table it is evident that the changes in scores were noticeable enough in all the participants again irrespective of their baseline scores. The general trend was thus the same across the participants for this sub-section. A similar trend was also observed in RF (in RT and ACC). However the improvement in ACC was found to be less in all participants in comparison to RT which

showed better changes post treatment for participants. Word recognition was also worked upon however the scores were not taken up for analysis owing to the redundancy of the material as the same words were scored for accuracy under RF. The words used in this section were from the passage taken up for reading fluency, hence word recognition scores and ACC were almost very similar and hence the data was not taken up for analysis.

Comparison of the performance of all the participants on each task of PH revealed a similar pattern of improvement on all tasks (Rle, Rlc and LS) by all participants except for participant D1, where a slight disparity in the improvement of Rlc and Rle was observed following therapy. Above results suggest that with respect to phonics the improvement was minimal in the rules. All participants experienced difficulty understanding the phonic rules which can be established only over a longer period of time. The performance in letter sound identification showed improvements across all subjects owing to its less complexity in learning. Also the letters taken up initially were easy ones such as 'p', 't' etc. than 'c' or 'g' which have more than one sound depending upon the context.

RF measures as mentioned earlier had RT and ACC measures which were scores of which were compared in baseline versus post therapy condition. In general there was improvement in RT though not in all participants and improvement in ACC was common for all participants following therapy. The general trend showed an increase in RT though not consistent with all. Another observation with ACC scores revealed a similar baseline scores in ACC across participants.

Comparison of performance of all participants across each task of RF reveals an improvement in RT in participants D1 and D2 from baseline to post therapy condition and a not so significant change in RT of participants D3 and D4 from baseline to post therapy condition as evident from Table 1. In RT maximal improvement was seen in participant D2 as mentioned earlier in individual performance. With respect to ACC improvement was observed in all participants from baseline to post therapy scores. When comparing RT and ACC scores for each participant disparity was observed in the scores of participant D2, with higher RT in comparison to ACC baseline scores, with higher RT scores to ACC baseline scores. Similarly the scores of participant D4 showed a relatively lower baseline RT measures in comparison to ACC baseline.

Thus in this domain a general improvement in phonics was observed across all participants though acquiring the rules was observed to be little difficult. LS task was relatively easier for the participants as only consonant sounds were only taken up and vowels and letters having more than one sound such as 'c', 'g' were not taken up. Though the concept of letter sounds was easily acquired by children, the scores were relatively good in this section. In RF, RT and ACC measures also followed the general trend with higher post scores following therapy. However RT did not show significant improvement in participants D3 and D4. ACC showed to have improved for all participants. In general performance of participant D2 was higher in comparison to other participants and especially noticeable in progress in RT. Inclusion of phonics in reading instruction is supported by many studies incorporating emergent literacy skills. Phonics has been suggested to be useful for kindergarten and first grade students to associate the symbol to sound correspondence (Schneider, Kuspert, Roth, Vise & Marx, 1997). Phonics was used with these children since they were learners of English and providing explicit instruction on phonics would be beneficial to them in developing overall better performance in word recognition.

Strategies used for each participant was different with respect to their baseline reading rate and accuracy measures. Repeated reading with modeling and feedback was used uniformly across all participants as this has been the most effective strategy as reported in literature till date (National Reading Panel, 2000).

To work on reading comprehension (RC), activities such as sentence puzzle (SP), story sequencing (SS) and summarization (SUM) were taken up. General trend was similar to other domains with an improvement in post therapy scores in comparison to baseline scores across all tasks in all participants. SUM was worked upon only for participants D1 and D2 as scores of D3 and D4 were below criterion for earlier tasks. When considering comparison of scores across tasks for all participants, SS was found to be relatively easier for all participants with a better score. This may be because the SS scores (in %) were obtained by combining the scores on sequencing of story cards and also by asking child to sequence story using graphic organizers. Scores on SP were slightly lower as children found difficulty putting the chunked sentences in order especially when the sentences were complex. SUM on the other hand was taken up for only participants D1 and D2 and results do not show much

improvement owing to lesser number of sessions for which this task was taken up.

Overall in this section on RC, improvement was observed in the tasks on SP and SS for all subjects. And SUM was taken up for participants D1 and D2 but only for few sessions. The scores on SS were higher as it was a combined score of sequencing cards and saying out the sequence where sequencing cards was performed well by all participants. Reading comprehension began with sentence puzzle (Scott, 2009). As sentence level comprehension was found to have a positive influence on reading comprehension. Thus for all the participants this skill was worked upon initially as there are existing models and research reports supporting the breakdown at the sentence level resulting in reading comprehension deficits. All the participants were found to have problems at sentence level processing especially with complex sentences, passive forms and for those featuring distance dependencies. However there also exist reports in literature reporting no significant positive outcomes from explicit teaching of sentence complexity. SUM was taught for participants D1 and D2 by familiarizing with 'self cue' cards which also served as self monitoring strategy. Summarization is one strategy which has reported to be beneficial for CWD in literature, especially when supported with cueing cards assisting self monitoring. Though comprehensive reports on the improvement in reading comprehension is available, with such limited duration as in the present study no comments can be made on the efficacy of the approaches used. Curriculum based text was used as the material for both the participants for better understanding and to assure relevancy of the material and also as supported by narrow view of reading. Summarization was initially carried out in native language as the comprehension of the material is the focus in this strategy. Such an approach making use of native language strategically can be used with English Language Learners (ELL) as in Indian setting.

Conclusions

In the present study a treatment manual in English for Indian children with dyslexia was developed, incorporating all the important domains crucial for the acquisition of fluent reading. This would serve as an important tool for the clinicians in clinical setting when working with children with learning disability. The sensitivity of the present manual needs to be tested across many subjects.

The treatment strategy followed in the present study was intense with explicit instructions. Such an approach to reading instruction has been highlighted by Response to Intervention (RTI) which is advocated by explicit and intense instruction. RTI has been the focus of interest for assessment and intervention in the recent years. Recently this RTI model has gained immense attention in determining the eligibility of having a reading disability apart from the IQ discrepancy criteria which was earlier considered a main criterion for enrolling any child for special reading instruction. As suggested in the literature effective reading instruction incorporates use of the following evidence-based skills, known to promote successful beginning literacy: (a) awareness of and ability to manipulate phonemes in segmenting and blending strategies (b) awareness and understanding of letter-sound correspondence (Byrne & Fielding-Barnsley, 1989; Foorman et al., 1998; Abbott, Walton & Greenwood, 2001) (c) the ability to translate the speech stream sound structures of oral language (phonological processing) into written language (Adams, 1990) and (d) fluency in decoding words and understanding word meaning (Adams, 1990).

References

Abbot, M., Walton, C., & Greenwood, C. R. (2001). Phonemic awareness in kindergarten and first grade. *Teaching Exceptional Children, 34*(4), 20-26.

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Bailet, L. L., Repper, K. K., Piasta, S. B., & Murphy, S. P. (2009). Emergent literacy intervention for prekindergarteners at risk for reading failure. *Journal of Learning Disability, 42,* 336-355.

Bradley, L., & Bryant, P. E. (1983). Categorizing sounds and learning to read: A causal connection. *Nature, 301*, 419-421.

Brown, A. L., Palincsar, A. S., & Purcell, L. (1986). Poor readers: Teach, don't label. In U. Neisser (Eds.), *The school achievement of minority children: New perspectives* (pp. 105-143). Hillsdale, NJ: Erlbaum.

Byrne, B., & Fielding-Barnsley, R. (1989). Phonemic awareness and letter knowledge in the child's acquisitions of the alphabetic principle. *Journal of Educational Psychology, 80(1),* 313-321.

Carver, R. P. (1992). Reading rate: Theory, research, and practical implications. *Journal of Reading, 32,* 84-95.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd Ed).* Hillsdale, NJ: Eribaum.

Cunningham, P. (1999). What should we do about phonics? In L. Gambrell, L. Morrow, S. Neuman, & M. Pressley (Eds.), *Best practices in literacy instruction* (pp. 68–89). New York: Guilford.

Daly, E. J., & Martens, B. K. (1994). A comparison of three interventions for increasing oral reading performance: Application of the instructional hierarchy. *Journal of Applied Behavior Analysis, 27,* 459–469.

DiCecco, V. M., & Gleason, M. M. (2002). Using graphic organizers to attain relational knowledge from expository text. *Journal of Learning Disabilities, 34*(4), 306-321.

Englert, C. S., Tarrant, K. L., Mariage, T. V., & Oxer, T. (1994). Lesson talk as the work of reading groups. The effectiveness of two interventions. *Journal of Learning Disabilities, 27,* 165–185.

Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology, 90,* 37-55.

Gersten, R., & Baker, S. (2001). Teaching expressive writing to students with learning disabilities. *Elementary School Journal, 101(3),* 251-272.

Gilbert, L. M., Williams, R. L., & McLaughlin, T. F. (1996). Use of assisted reading to increase correct reading rates and decrease error rates of students with learning disabilities. *Journal of Applied Behavior Analysis, 29,* 255–257.

Gough, P., & Tunmer, W. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7,* 6-10.

Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inference during narrative text comprehension. *Psychological Review, 101* (3), 371-395.

Griffin, C. C., Simmons, D. C., & Kame'enui, E. J. (1991). Investigating the effectiveness of graphic organizer instruction on the comprehension and recall of science content by students with learning disabilities. *Journal of Reading, Writing, and Learning Disabilities International, 7,* 355–376.

Iverson, S., Tunmer, W. E., & Chapman, J. W. (2005). The effects of varying group size on the reading recovery approach to preventative early intervention. *Journal of Learning Disabilities, 38,* 456–472.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology, 80 (4),* 443–47.

Kim, A., Vaughn, S., Wanzek, J., & Wei, S. (2004). Graphic organizers and their effects on reading comprehension of students with LD: A synthesis of research. *Journal of Learning Disabilities, 37,* 105-118.

Kucan, L., & Beck, I. L. (1997). Thinking aloud and reading comprehension research: Inquiry, instruction, and social interaction. *Review of Educational Research, 67*(3), 271-299.

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6,* 293–323.

Loomba, M. (1995). Descriptive analysis of the sequential progression of English reading skills among Indian children. *University of Mysore* Retrieved May 22, 2010, from http:// aiishdigilib. in: 8080/ digitallibrary/ HomeAdvanveResult. do

Marston, D., Deno, S. L., Dongil, K., Diment, K., & Rogers, D. (1995). Comparison of reading intervention approaches for students with mild disabilities. *Exceptional Children, 62,* 20-38.

Mattingly, I. G. (1972). Reading, the linguistic process, and linguistic awareness. In J. F. Kavanagh & I. G. Mattingly (Eds.), *Language by ear and by eye: The relationships between speech and reading.* Cambridge, MA: MIT Press.

Mattingly, I. G. (1984). Reading, linguistic awareness, and language acquisition. In J. Downing & R. Valtin (Eds.), *Language awareness and learning to read.* New York: Springer-Verlag.

McKoon, G., & Ratcliff, R. (1992). Inference during reading. *Psychological Review, 99* (3), 440-466.

Moseley, F. (Edn.) (1993). *Marx's method in "Capital": a reexamination.* Atlantic highlands, N. J., Humanities Press.

Nathan, R. G., &. Stanovich, K. E. (1991). The causes and consequences of differences in reading fluency. *Theory into Practice, 30,* 176–184.

National Reading Panel. (2000, April). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. (NIH Pub. No. 00-4769). Retrieved July 27, 2001, from http:// www. nichd. nih. gov/ publications/nrp/smallbook.htm.

National Institute of Child Health and Human Development. (2000a). Report of the National Reading Panel. *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4769). Washington, DC: Government Printing Office.

Perfetti, C. A. (1999). Comprehending written language: A blueprint of the reader. In C. Brown & P. Hagoort (Eds.), *The neurocognition of language* (pp. 167-208). New York: Oxford University Press.

Perfetti, C. A. (2007). Reading ability: Lexical quality to comprehension. *Scientific Studies of Reading, 11*(4), 357-383.

Rashotte, C. A., & Torgesen, J. K. (1985). Repeated reading and reading fluency in learning disabled children. *Reading Research Quarterly, 20, 2,* 180-188.

Rose, T. L. (1984). The effects of two prepractice procedures on oral reading. *Journal of Learning Disabilities, 17,* 544–548.

Schneider, W., Kuspert, P., Roth, E., Vise, M., & Marx, H. (1997). Short- and long-term effects of training phonological awareness in kindergarten: Evidence from two German studies. *Journal of Experimental Child Psychology, 66,* 311 – 340.

Scott, C. M. (2009). A case for the sentence in reading comprehension. *Language, Speech and Hearing Services in School, 40,* 184-191.

Shilpashree, H. N. (2004). Children with reading disability: A remedial manual on meta phonological skills. Unpublished Master's dissertation, University of Mysore.

Swain, K. D., & Allinder, R. M. (1996). The effects of repeated reading on two types of CBM: Computer maze and oral reading with second-grade Students with learning disabilities. *Diagnostique, 21*(2), 51-66.

Swanson, T, J., Hodson, B, W., & Aikins, M. S. (2005). An examination of phonological awareness treatment outcomes for seventh-grade poor readers from a bilingual community. *Language Speech and Hearing Services in Schools*, 36, 336-345.

Torgesen, J. K. (1998). *Individual differences in response to reading intervention.* Paper presented at the Pacific Coast Research Conference, LaJolla, CA.

Torgesen, J. K., Rashotte, C. A., & Alexander, A. W. (1997). Principles of fluency instruction in reading: Relationships with established empirical outcomes. In M. Wolf (Eds.), *Dyslexia, fluency and the brain* (pp. 332–355). Timonium, MD: York Press..

Vadasy, P. F., Jenkins, J. R., & Pool, K. (2000). Effects of tutoring in phonological and early reading skills on students at risk for reading disabilities. *Journal of Learning Disabilities, 33*(6), 579-590.

Vaughn, S., Chard, D. J., Bryant, P., Coleman, M., Tyler, B., Thompson, S. L., & Kouzekanani K. (2000). Fluency and comprehension interventions for third-grade students: Two paths to improved fluency. *Remedial and Special Education, 2,* 325-335.

Vellutino, F. R., Scanlon, D. M., Sipay, E. R., Small, S. G., Chen, R., Pratt, A., & Denckla, M. B. (1996). Cognitive profiles of difficult to remediate and readily remediated poor readers: Early intervention as a vehicle for distinguishing between cognitive and experiential deficits as basic causes of specific reading disability. *Journal of Educational Psychology, 88,* 601-638.