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Assessing the Status of Phonemic and Auditory Symptoms, and Examining the Effects of Dyslexic Phonemic R3 Approach on Reading Development of Indian Children with Dyslexia

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Abstract

Dyslexia is a neuro-sensory issue that makes reading challenging. However, Dyslexic Phonemic R_3 is a novel approach that improved the phonological development and resolved the reading challenges of dyslexia. The primary goal of the study was 1) to evaluate the current state of the phonemic and auditory symptoms of children with dyslexia and 2) To study the effects of the Dyslexic Phonemic R_3 Approach on the reading development of children with dyslexia. The Dyslexic Phonemic R_3 Approach was the only experimental group in the case study, which examined the prevalence of dyslexia among the participants. There was no control group. 45 students with dyslexia were the participants chosen from thirty schools in the Indian town of Silchar. These adolescents were chosen from a population of 12–13-year-olds with auditory and phonemic deficiencies after getting the consents of their parents. The Dyslexic Phonemic R_3 Approach significantly improved the reading, and spelling habit of student with dyslexia. The dyslexic phonemic R_3 approach was developed in Assam University, Silchar, India by Dr. Ananta Kumar Jena. Vowels in this context are phonemic patterns that are primarily divided into two types: long and short vowels, and syllables (closed and open). In many situations, short vowels are most frequently utilised. The Dyslexia-Phonemic R_3 technique uses these three procedures to diagnose dyslexia.

Keywords: auditory and phonemic deficiency, dyslexic phonemic R_3 approach, phonological awareness, phonological development of dyslexia

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1. Introduction

In this paper the author used teaching technique for improving the reading and spelling habit of children with dyslexia. Out of various methodologies used since last decade; phonological approaches have significant effects on developing reading and writing skills in English while the wide ranging debate has centered on the nature and intensity of interventions required to enable students to make gains in reading and spelling. In this experiment, many students faced residual difficulties in becoming fluent decoders of texts during reading. This deficit, while it may be a stumbling block for a range of students who are considered developmentally delayed, a sub-set of this disparate group, diagnosed with dyslexia have profound difficulties in developing the prerequisite abilities, centrally phonological and phonemic awareness that underpin phonics instruction. Moreover, other difficulties pertaining to short term memory, rapid naming and so forth are implicated in these difficulties. Across the last three decades, a plethora of research studies have been conducted to ascertain the central mechanisms implicated in the difficulties experienced. Overall, a degree of consensus has been reached that linguistic deficits, as revealed in the recognizing, memorizing and synthesizing of sounds, are implicated in the difficulties experienced. The authors have touched on these issues which are pertinent to the current study. Different teaching methods and techniques have evolved over more than a hundred years for teaching reading to all students including those living with dyslexia.

Recently, the dyslexic reading disorder of children is identifying through functional magnetic resonance imaging and positron emission tomography (Bryant & Seay, 2020; Krafnick et al., 2011). The left hemisphere of the brain of a dyslexic child has normally less electrical activation in the inferior frontal gyrus, parietal lobe, and the temporal cortex (Chaparro et al., 2020; Grizzle, 2007). Nowadays, different methods of teaching techniques developed for dyslexia and out of these phonological approaches are most helpful for improving the difficulties of reading and writing skills in language (Afonso et al., 2019; Conroy et al., 2012). The goal of phonic is to enable the reader with new words by sounding them out to pronounce the words through the lexical and sub-lexical reading process (Bowey & Muller, 2005; Charles & Margaret, 2016).

However, the sub-lexical reading involves teaching and reading in association with alphabets (e.g. consonants and vowels) and sound where the lexical reading involves with the words without attention to the characters (Liu et al., 2019). However, English spelling is based on phonetics and alphabetic principle (Egan & Tainturier, 2011) where alphabets are added with each other to constitute a word (e.g. cat is spelled with three letters, c, a, t) represents a phonic (/c/a, and /t) (Krivec et al., 2019). The spelling structures of E alphabet sometimes equal with each other like a ‘snake’, ‘palace’, ‘house’, and ‘bicycle’ while phonemics ‘s’ in ‘snake’ and ‘glass’; and ‘ce’ in palace, ‘se’ in house, and ‘c’ in city are complex words represented by 26 letters of alphabets are phonics. The letter ‘A’ has different positions in different words like – ape, cat, and zebra where ‘a’ in the first, second, and third in position respectively. In addition, the letter ‘a’ may appear more than once in a word, and its sound might be the same or different from each time appears into two words like – clock, cattle, and airplane.

The word phonics belongs to the branch of linguistic concerned with spoken sound or phonetics establishes the relationship between sound and symbol (Boets et al., 2007). There are two rules in phonics – cognitive reading skill and the alphabetic principle. Alphabetic phonics has two patterns – vowel phonic and consonant phonic. In the case of the long vowel of phonic pattern, sound comes in a long time base (/ei/ in baby, /ie/ in meter). Closed syllables are the English vowels followed a consonant i.e button. Here /u/ represents a short sound. In the case of an open syllable, the vowel has a long sound like basin |ba| in an open syllable (Gottfried et al., 2019).

1.1 Statement of the Problem

The present study aimed to assess the effect of Dyslexic Phonemic R_3 approach on phonological development of Indian children with dyslexia. Here, instructional approach was an independent variable, the models of Phonology for word exercising strategy. The children with dyslexia face difficulty in reading and are not able to comprehend the word fluently and accurately due to lack of normal intelligence (Egan & Tainturier, 2011). It’s the early symptom promotes reversal or mirror writing and lately unable to read and listen properly (Fuchs et al., 2015). In the later stage, learners may not be able to generate words or count the syllables in the words and faced difficulty to spell properly (Jena, 2017). In addition, dyslexia is a developmental reading disorder associated with difficulties in memorizing and reading aloud (Bowey & Muller, 2005).

Moreover, children with a reading problem in a language might not have a reading problem in another language (Gehrke et al., 2014; Holopainen & Hakkarainen, 2019). However, the insight of Dyslexia-Phonemic R_3 is based on

recognition, repetition, and reconstruction principles act as an effective approach in reading development of dyslexia. Moreover, writing and learning of a new letter needs graph motor skills in children with developmental coordination disorder (Huau et al., 2015). In this connection, Dyslexia-Phonemic R_3 Approach has a significant role to train the students with dyslexia to solve the difficulties of reading (Jena, 2019). The following three steps were followed during the instruction.

1.1.1 Step 1 Recognition of Dyslexia

Dyslexic children could be identified in their phonology, orthography, morphology, and lexicon (Justice et al., 2019). Mostly, children fail to recognize and recollect the letters causes poor spelling and derivational errors. A child may not be able to read new words, forgets to spell words, long words, and fails to recognize, and recollect the words (Lemperou, Chostelidou, & Griva, 2011).

1.1.2 Step 2 Repetitions/ Exercise

During the initial worksheet, the teacher clearly pronounces the name of the alphabet 'a' and pronounces the word i.e. 'a' for 'apple' and the frequent sound of the teacher helps to promote high retention. In this process, there are four processes or practices such as insertion of a letter, the omission of a letter, the substitution of the wrong letter by any letter from a set of possibilities and separation of a set of words is the normal process of repetition and exercise.

1.1.3 Step 3 Reconstruction

For creating the phonological awareness, teacher frequently creates the sound of the words. A small unit of sound can help to construct a word could develop the linguistic structure of the word. A particular sound for a particular figure or diagram encourages the learners to practice more the sound-symbol association these encourage long retention. However, the instruction includes the teaching of the six basic syllables. The syllables directly help in word structure and morpheme is the smallest unit of the meaning of language. The smallest unit of language is an alphabet constitutes word has rules, prefix, and suffix. Syntax conveys meaning includes the grammar of the word and sentence structure. Frequently the learners can practice with an initial worksheet and in the final worksheet.

1.2 Research Questions

Based on the theoretical background and the reviews of scientific literatures, the following research questions are developed:

1) Does dyslexia affect the auditory and phonemic abilities of children?

2) Does the Dyslexic Phonemic R_3 Approach significantly impact how well dyslexic children learn to read?

1.3 Objectives

Based on the theoretical background, the current study has the following objective:

1) To study the existing status of phonemic and auditory symptoms of children with dyslexia.

2) To study the effects of the Dyslexic Phonemic R_3 Approach on the reading development of children with dyslexia.

1.4 Hypothesis

Based on the reviews presented above and linking with the second objective of the study, the following hypothesis was developed:

H_1: There would be a significant effect of the Dyslexic Phonemic R_3 Approach on the reading development of children with dyslexia.

2. Review of Related Literature

At the primary level, students with dyslexia have many difficulties in reading (Wijekumar, 2020) and it is a challenging task to cope them in a normal classroom environment (Alter et al., 2011). Dyslexic children have higher phonemic dislocation irrelevant to the linguistic environment (Lemperou et al., 2011; Sumner et al., 2014) suffering from developmental difficulties in speech and sounds (Bogliotti et al., 2008). However, Gerrits and Bree (2009) claimed that phonological decoding, rapid automatic hearing, single-word reading, vocabulary, and spelling check are the

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techniques used to develop the reading habit of dyslexic students, but no phonological disorders found among the children with mixed dyslexia (Soriano & Miranda, 2010; Valdois et al., 2011).

In a case study of English–Japanese bilingual dyslexia, it was found that orthography to phonology mapping is transparent and the sound develops phonological dyslexia is irregular (Bogliotti et al., 2008; Oganian & Ahissar, 2012). Speech perception is related to the family history of the children who found a lower level of auditory and phonological abilities (Arfé et al., 2020). Wengelin and Arfé (2018) applied two approaches to the teaching of phonemic in English to the children with dyslexia. The first approach was based on rhymes, alliteration, and story activity and the second approach focussed on phoneme segmentation resulted that the second approach phoneme segmentation has a significant effect on the learner's attention (Boets et al., 2007; Peterson & Pennington, 2012). It was found that linguistic and non-linguistic processing speed difficulties in the younger dyslexic children over at a high rate than difficulty in phonological awareness and cognitive difficulty within two domains were greater in the older dyslexic children (Bailey et al., 2004; Saha et al., 2009).

Dyslexia is a developmental process (Bajre & Khan, 2019) needs cognitive attention (Oganian & Ahissar, 2012) and phonemic awareness to improve reading skill (Ukrainetz et al., 2011). Literature found that there was no significant relationship in the auditory, temporal process, and reading disabilities (Bowey & Muller, 2005; Jena & Choudhury, 2020) but visual strategy has significant impact on phonological presentation (Barnett et al., 2020; Boada & Pennington, 2006). Students with developmental dyslexia and the effective approach for manipulation found methods have a significant role to improve dyslexia (Jena et al., 2021; Peterson & Pennington, 2012). The short-term memory among adults with dyslexia has a significant relation with the language process (De Jong, 2006; Trecy et al., 2013).

In recently, f MRI applied to know the neural dissocial of phonological and visual attention span disorder in developmental dyslexia found there was an association between brain mechanisms and cognitive deficient among developmental dyslexia (Bruno et al., 2007; Prunty & Barnett, 2017). Interpretation model is an indicator to understand, diagnoses, the developmental dyslexia in pre-schoolers (Chung & Lam, 2020; Darling-Hammond, 2016). Mostly, dyslexia is a neuro-auditory process promotes auditory dysfunction among the developmental dyslexia (Duranovic et al., 2014; Phillips et al., 2019) and this neuro-auditory process can be improved through instruction dyslexia (de Smet et al., 2018; Vender et al., 2017).

Literature found that the auditory process, speech perception skills, and language development of children improved at familial risk of dyslexia (Gerrits & Bree, 2009; Logan et al., 2009) but developmental dyslexia has a positive effect with intervention (Graaff et al., 2008; Witton et al., 2019). However, it was very difficult to predetermine whether dyslexic children have a phonemic problem or not, if so then what types of dyslexic they have (Grizzle, 2007), do they auditory problem in hearing, or in reading of the words (Eden et al., 2004; Vidyasagar & Pammer, 2010). It's most urgent to link teacher–learner discourse with mathematical reasoning of students with learning disabilities (Xin et al., 2020). However, there is new insights on developmental dyslexia subtypes found in heterogeneity of mixed reading profiles (Jena et al., 2021; Zoubrinetzky et al., 2014).

3. Methodology

3.1 Participants

Forty-five (n=45 age range 12-13) dyslexic students were identified in a small city of the north-eastern region of India through phonemic screening check who were in later exposed to Dyslexic Phonemic R_3 Approach. The experiment was conducted with satisfying the norms and ethics of the Indian Ethical Council, University Ethical Committee, and the Department of Education, Assam University, Silchar, India. However, to fulfil the regulations of human research, the researcher took the permission of the parents or legal guardians, as well as the assents of the minor participants.

3.2 Design of the Study

The case study investigated the existing status of dyslexia among the students where there was no control group, only a single experimental group with forty-five students were the participants. Before instruction, an auditory and a phonemic screening check was administered to assess the existing status of dyslexia and followed by that dyslexic phonemic R3 intervention was provided in the working hours of each day. Moreover, twenty contact hours of instruction was provided to the students for their reading improvement. After this intervention, a single achievement test was administered to know the effectiveness of the method.

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3.3 Instruments

3.3.1 Phonemic Screening Check

The phonemic screening check contains three sections – section 1 contains vowel-based words, section 2 contains consonant based words, and section 3 has 50 different words related to color diagrams. The phonemic screening section 1 has five categories such as short vowels, long vowels, closed syllables, open syllables, vowel-consonant mentioned in five pages. Page 1 contains different short vowels related to word and alphabet, page 2 contains long vowels and related words, page 3 contains closed syllables and letters, page 4 contains open syllables and related vowel, the last page i.e. page 5 contains vowel-consonant E and R controlled syllables. Similarly, section 2 was divided into 2 pages. Page no 1 contains different consonant and words and the page no 2 contains short vowels and different consonant patterns. Section 3 contains different random words to identify the vowel and consonant with appropriate spelling, pronunciation relate to the phonemic process of the researcher. All these aspects of the tool were prepared as per the opinion of the experts. Content validity and the Cronbach alpha was .64 and respectively.

3.3.2 Auditory Check

Auditory check is a kind of checklist used to measure phonemic awareness, hearing ability, pronunciation, reading style, and listening habits of the learner. The phonemic awareness section has repeated vowel, repeated consonant, repeated word, and a repeated mirror image of words were given for identification and pronunciation skills of the learner. The auditory ability was nothing, only to measure the phonemic ability of the students help to identify the auditory problems of the learner.

3.3.3 Achievement Test

The phonemic achievement test of dyslexia has two sections such as Section -1 and Section – 2. In section-1, the variety of simple words having continuous alphabets, mixed vowels, and consonant types of words. To test the initial sound of the alphabet-reading test and a blank sheet were developed having the reliability and validity such as (.67 & .65 respectively). Section – 2 contains the word and its mirror images to identify the students' confusion and misreading. Similarly, the blank sheets were supplied to the students to know their achievement level.

3.4 The Procedure of Experiment and Data Collection with Dyslexic PhonemicR_3 Approach

Dyslexic Phonemic R_3 Approach was developed to create phonemic awareness among the students with dyslexia at the primary level. Here, R_3 has three phases such as 3) basic phases: Recognition of the type of dyslexic, Repetition, and Reconstruction. Earlier other psychologists have developed different dyslexic teaching tools but the recent tool (Dyslexic Phonemic R_3 Approach) was special to create awareness and phonemic development among the students with dyslexia. This approach has three parallel sessions. Session one deals with the recognition of types of dyslexia, the second session deals with the repetition of phonemics, and the final stage deals with the reconstruction of the word for final reading. Phonemic screening check helps to identify the difficulties of reading includes orthography, phonology, morphology, and lexicon. Similarly, an auditory checklist was used to assess the learners' difficulties in dyslexia.

After identifying the types of dyslexia, the initial sound worksheet was administered during the primary instruction. In this instruction, letter recognition, reconstruction, and poor spelling symptoms of the dyslexia were recognized. For pseudo words and non-words, repetition for modification of pronunciation technique was used followed by these omissions, substitution, derivation, separation, and transposition techniques were used where one hundred fifty-six (156) words used. A blank alphabet sheet was provided and advised how to insert the appropriate alphabet to construct a word. The intervention includes how to substitute the word, derive the word, and separate the word techniques were taught to the learners.

After initial instruction, decoding (reading) and encoding (spelling) techniques were taught. This was the part of the reconstruction step or third phase of the Dyslexic Phonemic R_3 Approach included six (6) basic syllables like- closed syllable, open syllable, vowel-consonant syllable, vowel-consonant E, and consonant IE. In this process, the instruction was provided followed by the final worksheet to the learner for practice and repetition. At the beginning of September 2013, the measuring tool like- phonemic screening check, auditory check, achievement test, and the instructional tool like- initial and final worksheet were administered. According to the need of the study, the researcher selected an Indian special school in Silchar. Before instruction and after instruction the initial and final check sheets were used to collect the data for final for analysis.

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3.5 Data Analysis

The measuring tool like- phonemic screening check, auditory check, achievement test were administrated. Before instruction and after instruction the initial and final check sheets were used to collect the data for final analysis. For objective 1, the existing phonemic and auditory status was interpreted in Tables 1, 2, and 3. The percentage of correct and wrong phonemic status of the students in the specific words like VAP, ULF, GECK, CHOM, TORD, THAZZ, BLAN, STECK, HILD, WOMEN, STOUT, STICK, APPLE, COLD, COME, DOWN, GOOD, and ANTS were assessed. Like these, the percentage of correct and wrong responses of auditory symptoms of children with dyslexia in various words such as VOO, LOUND, TERG, FAPE, SNEMP, BLURST, SPRON, STROFT, DAY, SLIDE, NEWT, PHONE, BLANK, TRAINS, STRAP, SCRIBE, RUSTY, FI,NGER, DENTIST, and STARLING were assessed. The hearing or the auditory status of children with dyslexia was counted at five levels. Each item has three options but the child has to select a response out of often, sometimes, and seldom.

The percentages of responses were interpreted to assess the hearing of auditory status of children with dyslexia. For hypothesis 1, the effect of the Dyslexic Phonemic R_3 Approach on the reading development of dyslexic students was assessed. The changes of scores in before and after exposed to students with dyslexia with Dyslexic Phonemic R_3 Approach on Phonemic (Spelling of pseudowords, fluency, and Semantic); Phonological awareness (syllable for deletion, consonant for deletion, Auditory acronyms, and Word judgment); Reading strategy (Pseudo words, Regular words, and Irregular words); and Spelling (Phonological error, Grammatical error, and Usual rules error) were assessed. Finally, t-test used to know the significant differences in the pre-test and post-test score for assessing the effect of Dyslexic Phonemic R_3 Approach on the phonological development of children with dyslexia,

4. Results

4.1 Objective 1: To study the existing status of phonemic, auditory symptoms, and auditory status of children with dyslexia.

Table 1. Existing phonemic status of dyslexia

Words	Correct	Incorrect	Interpretation
TOX	9 (20%)	36 (80%)	36 (80%) students were dyslexic in the case of the word 'TOX.'
BIM	18 (40%)	27 (60%)	27 (60%) were dyslexic in the case of the word 'BIM.'
VAP	0 (00%)	45 (100%)	45 (100%) students were not able to pronounce the word 'VAP.'
ULF	18 (40%)	27 (60%)	27 (60%) students were dyslexic for the word 'ULF.'
GECK	0 (00%)	45 (100%)	45 (100%) was dyslexic in the case of the word 'GECK.'
CHOM	9 (20%)	36 (80%)	36 (80%) was dyslexic for the word of CHOM'.
TORD	18 (40%)	27(60%)	27(60%) were dyslexic in the case of the word 'TORD.'
THAZZ	0 (00%)	45 (100%)	45 (100%) students were dyslexic for the pronunciation of the word 'THAZZ.'
BLAN	18 (40%)	27 (60%)	27 (60%) students were seen dyslexic in the case of the word 'BLAN.'
STECK	0 (00%)	45 (100%)	45(100%) students were dyslexic for the word 'STECK.'
HILD	9(20%)	36 (80%)	36 (80%) students were interpreted as dyslexic in the case of the word 'HILD.'
WOMEN	0 (00%)	45 (100%)	45 (100%) was dyslexic for the pronunciation of the word 'WOMEN.'

STOUT	18 (40%)	27(60%)	27(60%) were seen that they were dyslexic for unable to pronounce the word STOUT.
STICK	18(40%)	27(60%)	27(60%) students were dyslexic in the case of the word 'STICK.'
APPLE	9(20%)	36(80%)	36(80%) students were dyslexic for the word 'APPLE.'
COLD	18(40%)	27(60%)	27(60%) students were dyslexic in the case of the word 'COLD.'
COME	9(20%)	36(80%)	36(80%) students were dyslexic for the word 'COME.'
DOWN	18 (40%)	27(60%)	27(60%) students were dyslexic in the case of the word 'DOWN.'
GOOD	9(20%)	36(80%)	36(80%) students were dyslexic for the pronunciation of the word 'GOOD.'
ANTS	0(00%)	45(100%)	45(100%) was dyslexic in the case of the word 'ANTS.'

Table 1 reveals that out of 45 students, 36(80%) were dyslexic in the case of the word 'TOX.' It was analyzed that 27 (60%) students were dyslexic in case of inability of the word 'BIM.' Here it was observed that among the 5 students, no one was able to pronounce the word 'VAP' means all were dyslexic. Like these, 27(60%) students were dyslexic for the word 'ULF' and all the 45 students (100%) were dyslexic in the case of the word 'GECK.' 65 students (80%) were dyslexic for the word of CHOM' and 27 students (60%) were dyslexic in the case of the word 'TORD.' In addition, it was found that all the students (100%) were dyslexic for the word 'THAZZ', 27 students (60%) in the case of the word 'BLAN' and hundred percent of students were dyslexic for the word 'STECK.' Out of 45 students, 36 were (80%) interpreted as dyslexic in case of the word 'HILD', 5 students (100%) for the pronunciation of the word 'QUEMP', 27 students (60%) among the 45 students were seen that they were dyslexic for unable to pronounce the word. It was observed that 27 students (60%) were dyslexic in case of the word 'GANG', 36 students (80%) for the word 'WEEK', 27 students (60%) were dyslexic in case of the word 'CHILL', 36 students (80%) were dyslexic for the word 'GRIT.' Like these, 27 students (60%) were dyslexic in case of the word 'START', 36 students (80%) were dyslexic for the pronunciation of the word 'BEST' and all the students (100%) were dyslexic in case of the word 'HOOKS.'

Table 2. Auditory symptoms of children with dyslexia

Words	Correct	Incorrect	Interpretation
VOO	18 (40%)	27 (60%)	27 (60%) students were dyslexic in the case of the word 'VOO.'
LOUND	0 (00%)	45 (100%)	45(100%) students were interpreted as dyslexic for pronouncing the word 'LOUND.'
TERG	1 (20%)	36 (80%)	36 (80%) students were dyslexic in the case of the word 'TERG.'
FAPE	9 (20%)	36 (80%)	36 (80%) students were found as dyslexic for the word 'FAPE.'
SNEMP	0 (00%)	45 (100%)	45 (100%) students were dyslexic in the case of the word 'SNEMP.'
BLURST	0 (00%)	45 (100%)	45 (100%) students were dyslexic in the word BLURST

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SPRON	18 (40%)	27 (60%)	27 (60%) students were dyslexic in the case of the word 'SPRON.'
STROFT	0 (00%)	45 (100%)	45 (100%) students were seen dyslexic for the pronunciation of the word 'STROFT.'
DAY	18 (40%)	27 (60%)	27 (60%) students' dyslexic in case of the word 'DAY.'
SLIDE	18 (40%)	27(60%)	27(60%) students were dyslexic for the word 'SLIDE.'
NEWT	17 (20%)	36 (80%)	36 (80%) students were dyslexic in the case of the word 'NEWT.'
PHONE	18 (40%)	27(60%)	27(60%) students were dyslexic for the pronunciation of the word 'PHONE.'
BLANK	18 (40%)	27 (60%)	27 (60%) students were dyslexic in case of the word 'BLANK.'
TRAINS	0 (00%)	45 (100%)	45 (100%) students were found as dyslexic in the word 'TRAINS.'
STRAP	9 (20%)	36 (80%)	36 (80%) students were dyslexic in the case of the word 'STRAP.'
SCRIBE	0 (00%)	45 (100%)	45 (100%) students were dyslexic for the word 'SCRIBE.'
RUSTY	18 (40%)	27 (60%)	27 (60%) students were dyslexic in the case of the word 'RUSTY.'
FINGER	18 (40%)	27 (60%)	27(60%) students were seen as dyslexic for the pronunciation of the word 'FINGER.'
DENTIST	9 (20%)	36 (80%)	36 (80%) students were dyslexic in case of the word 'DENTIST.'
STARLING	0 (00%)	45 (100%)	45 (100%) students were dyslexic in the pronunciation of the word 'STARLING.'

Similarly in Table 2, it was observed that out of 45 students 27 students (60%) were dyslexic in case of the word 'VOO', and 36 students (80%) were dyslexic in case of the word 'TERG' and 'FAPE.' All 45 students (100%) were seen the dyslexic students in case of the word 'SNEMP', and 'STROFT', 'BLURST.' Out of 45 students 27 students (60%) were investigated as dyslexic in case of the word 'SPRON''DAY', 'PHONE', 'BLANK','RUSTY', 'FINGER' and 'SLIDE.' When all the students were observed it was analyzed that those 36 students (80%) were seen dyslexic in case of the word 'NEWT' and 'STRAP.'

Table 3. Analysis of the auditory status of dyslexia

Often	Sometimes	Seldom	auditory skill	Analysis and interpretation
			LEVEL ONE	
0(0%)	0(0%)	0(0%)	Hearing aids used at all times except for naps and bathing.	Not a single child (00%) has any kind of hearing aids among the 5 children.
27(60%)	9(20%)	9(20%)	Children's eyes widen when they	Among the 45 children, 27(60%) children have often and 9 children (20%) sometimes and the other's 9 children (20%) seldom

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			hear their mother's voice.	have eyes widen when they hear their mother's voice.
27(60%)	9(20%)	9(20%)	Children pause to listen to father's voice	In this case, 27 students (60%) among the 9 children often paused to listen to the father's voice, only one (20%) sometimes and nine (20%) students seldom did this.
18(40%)	18(40%)	9(20%)	Children glance or move in search of the sound.	It was seen that among the 45 students 18 students (40%) did this, 18 others (40%) sometimes glanced and moved and 9 (20%) seldom did this.
18(40%)	18(40%)	9(20%)	Children turn to Mom when they call her.	18 children (40%) often turned, the other 18 children (40%) sometimes and 9 children (20%) responded seldom turned to mom when they called her.
			LEVEL TWO	
27(60%)	9(20%)	9(20%)	Parents say ee-oh-ee and children imitate. Parents say woof-woof and children imitate.	At this time, it was observed that most of the students i.e. 27 children (60%) imitated their parents, only 9 (20%) sometimes and 9 children (20%) seldom imitated respectively.
18(40%)	18(40%)	9(20%)	Children thought that toys created a loud sound.	At the time of observation, it was seen that 18 students (40%) often indicated the toy that made a loud noise, the other 18 children (40%) sometimes and nine children (20%) seldom indicated this.
27(60%)	9(20%)	9(20%)	Mother calls children from another room, and they hear her.	Most of the students, 27 (60%) among the 45 often heard their mother from another room, 9(20%) children sometimes and the other 9 children (20%) seldom heard this.
18(40%)	18(40%)	9(20%)	Children recognized fox barking.	It was often seen that 18 students (40%) among the 45 students identified the fox's barking, smiled to her father's car, again 18 children (40%) sometimes and the 9 children (20%) seldom did this.
			LEVEL THREE	
18(40%)	18(40%)	9(20%)	"Where's Daddy?" "Ow! My finger hurts!" "Give mama a kiss!" Upon getting into the bedroom, the parent asks children to take asleep.	At the time of observation, it was seen that 18 children (40%) often, 18 children (40%) sometimes and 9 children (20%) seldom got their socks.
27(60%)	9(20%)	9(20%)	Children will hear the distinction	The maximum number of students 27 (60%) responded often, every of 9 children (20%)

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			between words like cricket and hockey.	sometimes and the other (20%) seldom could hear this type of difference.
18(40%)	18(40%)	9(20%)	Children clap once they understand any Ling's sounds.	It was seen that 18 children (40%) among the 45 children often clapped, 18 children (40%) sometimes and 9 children (20%) seldom clapped their hands.
18(40%)	18(40%)	9(20%)	Children can distinguish between words and sentences.	It was observed that among the 45 students 18 students (40%) often could tell the difference, 18 (40%) other sometimes and 9 (20%) seldom told this.
			LEVEL FOUR	
18(40%)	18(40%)	9(20%)	I am a spider man.	Among the 45 children 18 children (40%) often, 18 children (40%) sometimes and 9 (20%) were seen active in this case.
27(60%)	9(20%)	9(20%)	Children offered a pan to the teacher.	Among the 45 children larger number of children (60%) often participated in description games, one child (20%) sometimes and the other (20%) seldom participated.
18(40%)	18(40%)	9(20%)	Children completed the work related to the triangle.	At the time of observation it was seen that 18 students (40%) among the 45 often completed the statement, another 18 students (40%) sometimes and 9(20%) seldom completed it.
18(40%)	18(40%)	9(20%)	"What do you do when you're doing wrong?"	In this case, 18children (40%) often wanted food, 18 children (40%) sometimes and 9(20%) seldom wanted food.
			LEVEL FIVE	
27(60%)	9(20%)	9(20%)	Children used 'ed' in past tense.	At this time, most of the students 27 (60%) often acted like this, 9 students (20%) sometimes and another 9students (20%) seldom acted like this.
18(40%)	18(40%)	9(20%)	Children raised hand.	At the time of observation, it was seen that 18 children (40%) among the 45 children moved their finger, another 18 (40%) sometimes and nine children (20%) seldom moved their finger.
27(60%)	9(20%)	9(20%)	Children understand the main idea of a story.	During the interpretation, it was observed that 27 students (60%) among the 45 often understood, 9 children (20%) sometimes and another 9 children (20%) seldom understood.
27(60%)	9(20%)	9(20%)	Children wrote a story on hair.	Here most of the students (60%) often listened to and understood the story, one

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student (20%) sometimes and the other (20%) seldom listened to and understood it.

4.2 Hypothesis 1: There would be a significant effect of the Dyslexic Phonemic R_3 Approach on the reading development of dyslexic students

Table 4. M, SD, and t of students' before and after treatment through Dyslexic Phonemic R3 approach on the reading development of dyslexic

Variable	N	Before treatment		After treatment		t	df	p
		M	SD	M	SD			
Phonemic								
Spelling of pseudoword	45	9.91	1.64	17.40	1.73	21.28	44	.000
fluency	45	10.13	1.50	17.42	1.27	22.53	44	.000
Semantic	45	9.64	1.60	16.91	1.95	18.05	44	.000
Phonological awareness								
syllable for deletion	45	9.00	1.51	15.73	2.73	15.00	44	.000
consonant for deletion	45	8.53	1.36	14.64	3.28	12.33	44	.000
Auditory acronyms	45	8.53	1.46	15.04	3.18	13.15	44	.000
Word judgment	45	8.44	1.27	14.58	3.23	11.93	44	.000
Reading strategy								
Pseudo words	45	8.84	1.53	14.73	3.27	11.21	44	.000
Regular words	45	9.22	1.66	14.60	3.01	10.38	44	.000
Irregular words	45	8.53	1.36	14.64	3.28	12.33	44	.000
Spelling								
Phonological error	45	8.53	1.46	15.04	3.18	13.15	44	.000
Grammatical error	45	8.44	1.27	14.58	3.23	11.93	44	.000
Usual rules error	45	15.40	4.15	21.40	2.70	4.35	4	.000

Table 4 reveals the impact of treatment on the reading skills of dyslexic students. Various dimensions were analyzed and it resulted that after treatment the dyslexic students' phonemic or reading skill was significantly higher than before treatment. Phonemic spelling, pseudo word, the after-treatment mean score (17.40 $\pm$ 1.73 M) was significantly higher than before treatment (9.91 $\pm$ 1.64M) and the t value (df 4421.28 $p < 0.00$) was significant. The phonemic fluency before treatment mean score (10.13 $\pm$ 1.50M) was significantly lower than after treatment (17.42 $\pm$ 1.27M) and the t value (df 4422.53 $p < 0.00$) was significant. Similarly, the semantic fluency after treatment mean score, (16.91 $\pm$ 1.95 M) was significantly higher than before treatment score (9.64 $\pm$ 1.60 M) and the t value (df 4418.05 $p < 0.00$) was significant (see fig 1).

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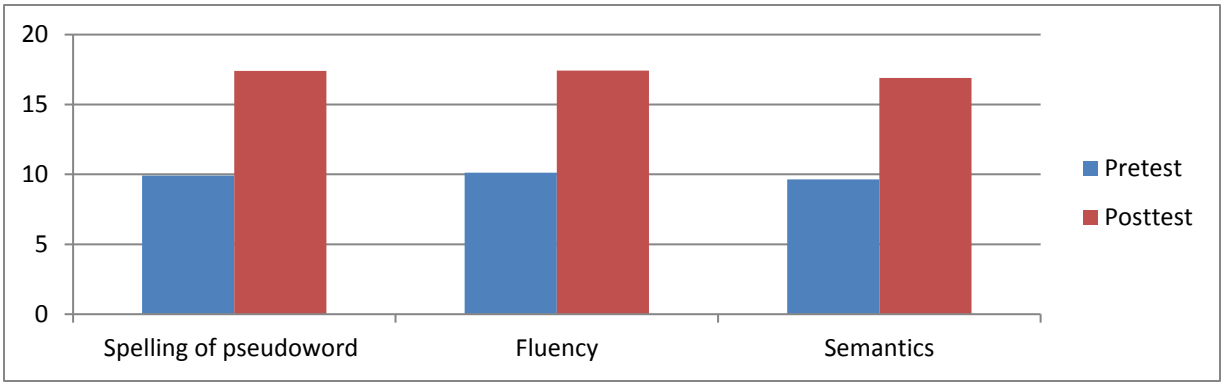


Fig 1. Pretest - posttestt mean of phonemic development after exposed to Dyslexic Phonemic R_3 Approach

In phonological awareness, the after-treatment 1st syllable deletion mean score, (15.73 ± 2.973 M) was significantly higher than before treatment score (9.00 ± 1.51 M) and the t value (df 44 15.00 p <0.00) was significant. The 1st consonant deletion, before treatment, mean score (8.53 ± 1.36 M) was significantly lower than after treatment (14.64 ± 3.28 M) and the t value (df 4412.33 p < 0.00) was significant. Like these, the auditory acronyms after treatment mean score (15.04 ± 3.18 M) was significantly higher than before treatment score (8.53 ± 1.46 M) and the t value (df 4413.15 p < 0.05) was significant. The word judgment, before treatment score (8.44 ± 1.27 M) was significantly lower than after treatment score (14.58 ± 3.23 M) and the t value (df 4411.93 p < 0.00) was significant (see Fig 2).

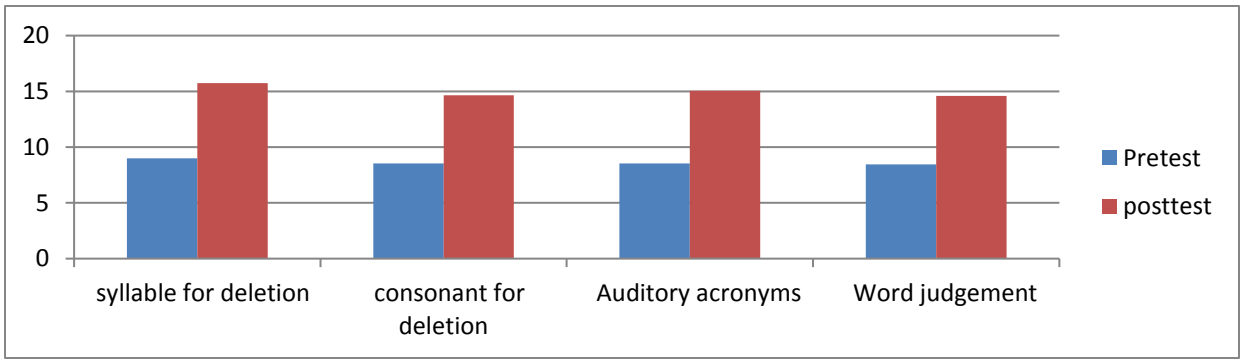


Fig 2. Pretest - posttestt mean of phonological awareness after exposed to Dyslexic Phonemic R_3 approach

In reading strategy, before treatment pseudo words score (8.84 ± 1.53 M) was significantly lower than after treatment score (14.73 ± 3.27 M) and the t value (df 44 11.21 p < 0.00) was significant. The regular words, after treatment score (14.60 ± 3.01 M) was significantly higher than before treatment score (9.22 ± 1.66 M) and the t value (df 44 10.38 p < 0.00) was significant. The irregular words, before treatment score (8.53 ± 1.36 M) was significantly lower than after treatment score (14.64 ± 3.28 M) and the t value (df 44 12.33 p < 0.00) was significant (see Fig 3).

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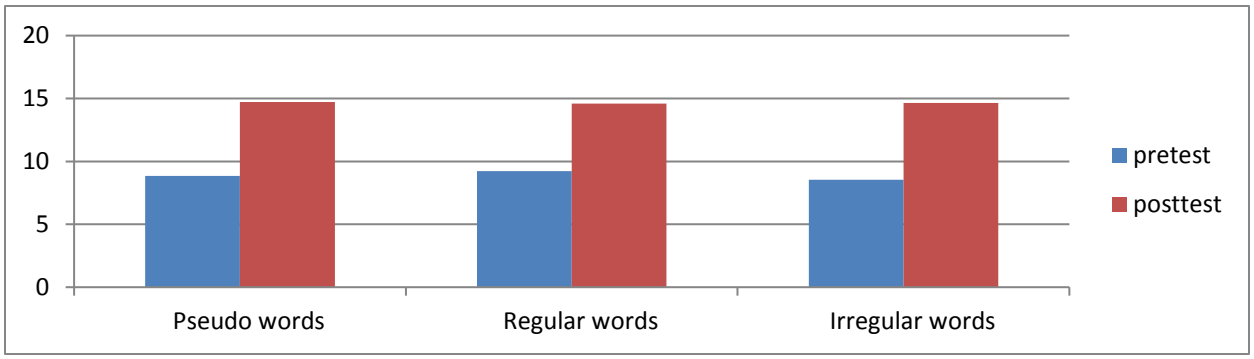


Fig 3.Pretest - posttestt mean of reading development after exposed to Dyslexic Phonemic R_3 approach

In spelling, phonological error, after treatment score (15.04 ±3.18 M) was significantly higher than before treatment score (8.53 ± 1.36 M) and the t value (df 4413.15 $p < 0.00$) was significant. The grammatical error, before treatment score (8.44 ±1.27 M) was significantly lower than after treatment score (14.58 ±3.23 M) and the t value (df 4411.93 $p < 0.00$) was significant. The usual rules error, after treatment (16.91 ±1.95 M) was significantly higher than before treatment score (9.64 ±1.64 M) and the t value (df 4418.05 $p < 0.00$) was significant (see Fig 4).

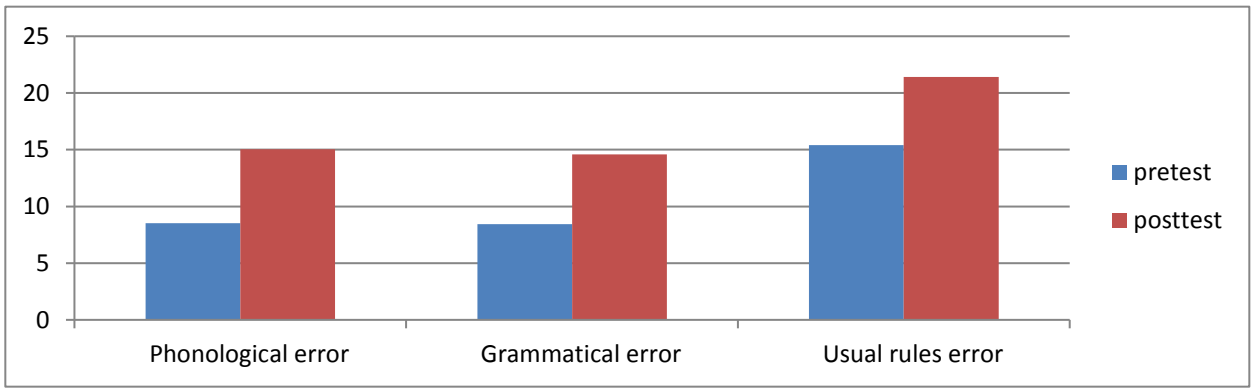


Fig 4. Pretest - posttestt mean of spelling after exposed to Dyslexic Phonemic R_3 approach

5. Discussion

It was claimed that the reading ability of dyslexic students was studied and it was found that the learners had hearing inability with dyslexic symptoms. After a phonemic screening test and auditory check, forty-five dyslexic students were identified with more than 60%-100% dyslexic symptoms related to phonology, orthography, morphology, and lexicon. The result was corroborated with (Saha et al., 2019) found that the earning lexical information depends upon task, learning approach, and reader subtype.

In addition, children failed to recognize and recollect the letters causes poor spelling (Soriano & Miranda, 2010). A child may not be able to read new words, forgets to spell words, long words, and fails to recognize, and recollect the words (Prunty & Barnett, 2017). The main goal of the study was to improve the reading skill of learners through Dyslexic Phonemic R_3 Approach. Learners practiced repetition or exercised to insert, omit, substitute, derivate, separate, transport the vowel and consonant to the required field, and taught how to reconstruct the word. In this way, the researcher continued and instructed for twenty contact hours means one contact hour per day. It resulted that Dyslexic Phonemic R_3 Approach has a significant effect on phoneme, phonological awareness, reading strategy, and spelling of dyslexic students.

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Conroy et al. (2012) corroborated the result and suggested dyslexia is a neuron-developmental disorder while a single methodology is insufficient to cop the reading skill of dyslexia. Similarly, Trecy et al. (2013) argued dyslexia is an impairment of short-term memory but the modern method can help to develop the information processing of short-term memory as an effort to written information more time. It resulted that Dyslexic Phonemic R_3 Approach has a significant effect on phonemic, phonological awareness, reading strategy, and spelling of dyslexic students. In phonemic, spelling pseudo word, phonemic fluency and semantic fluency cases students' before and after treatment of reading score was significantly different, that was due to treatment effect.

This result was supported by Ukrainetz et al. (2011), Valdois et al. (2011), Vender et al. (2017), and Vidyasagar and Pammer (2010). Similarly, in phonological awareness, learners' before and after treatment of reading score in first syllable deletion, first consonant deletion, auditory acronyms, and word judgment were significantly different. Their t- value was significant, that was due to the treatment effect. In reading strategy, before and after treatment the score of pseudowords, regular words, and irregular words reading scores was significantly different. In the spelling of a word, the before and after treatment reading skill in phonological error, grammatical error and usual rules error score was significantly different. This result of the study was supported by Bruno et al. (2007), De Jong (2006), Graaff et al. (2008), Grizzle (2007), and Vidyasagar and Prommer (2010).

In the modern context, one can apply these three results in general classroom situation and teachers could identify the symptoms of dyslexic students in the general classroom situation. Teachers can apply the auditory checklist among all students to identify the percentage of hearing disability and accordingly they should provide special care to cope the dyslexic students (Phillips et al., 2019; Wengelin & Arfé, 2018). However, the auditory check may not be able to identify the learners' actual hearing ability rather it discourages the learners' reading ability because frequently the hearing test discourages the learners to listen to or care to listen to anything. Phonological awareness also significantly influenced the hearing behavior of learners, in that controls paid more and earlier attention to the written information and made more transitions between the two modalities (Sumner et al., 2014). This suggests a systematic strategy to discern different words of English. It is very important to have home-based reading program with their disabled children (Logan et al., 2019).

6. Conclusion

The study investigated the existing status of auditory disability and dyslexic problems among the small sample of a school. At the beginning of the study, forty-five dyslexic students were identified through phonemic check and followed auditory check. The primary symptoms of dyslexia are associated with severe difficulty in reading skills. Although the cause of dyslexia is still unknown and it appears to have a universal neuro-cognitive problem that could directly influence by learning and teaching methods. The author claimed that Dyslexic Phonemic R3 approaches a suitable approach where the teacher pronounces the name of the alphabet and the word promoted high retention. However, the practices of insertion of a letter, the omission of a letter, the substitution of the wrong letter by any letter from a set of possibilities and separation of a set of words helped in the repetition and exercise.

6.1 Implications

Nevertheless, it couldn't be applicable without dedication, love, and affection with the dyslexic students. The teacher has less responsibility and the students himself or herself could repeat, or exercises to read the word through addition, deletion omission, and substitution of alphabets to practice a word. For creating phonological awareness, the teacher frequently created a sound of the words and a small unit of sound can help to construct a word that could develop the linguistic structure of the word. A particular sound for a particular figure or diagram encourages the learners to practice more and the sound-symbol association encourages long retention of the learner.

However, the syllable division rule directly taught to word structure. Syntax conveys meaning includes the grammar of the word and sentence structure. Frequently, the learners can practice with an initial worksheet and in the final worksheet. Anyhow, if a teacher identifies the types of dyslexic, then it could help to apply the Dyslexic Phonemic R3 approach. In this context, if the percentage of auditory problems, if initially identified then it could be helped the parent or teachers to cope with these students to feedback the difficulties at reading level. Although, reading certainly is predicated on some lower level cognitive processes dyslexia has also been linked to higher level cognitive processes involved with the identification, phonology, morphology, and phonetics those are cognitive processes, includes working memory, reasoning, problem-solving, planning, and execution.

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6.2 Recommendations

The study recommended the world of colleagues to undertake the studies to investigate dyslexic problems at an early age as compared to normal children. The present study was experimental research but the researcher recommended undertake the survey, co-relational, case-control, and cohort studies to investigate the feeling, perception, and interest of dyslexic students irrespective of BMI, gender, socio-economic status, and parental mental health for its broader generalization. The present study has several limitations. The children in the study diagnosed with Dyslexic Phonemic R3 approach had received interventions for the reading and writing but it is not clear whether this improvement may be generalized or not.

The sample used in the study was relatively small and was obtained by convenience sampling both of these were the constraints in the generalizability of the results. The small sample was odd regarding gender and schooling, as the researcher had some difficulties to engage the participants, which is a limitation of the study. Another limitation is to develop the reading ability of words instead of breaking down the text into several smaller areas of paragraphs. Despite these limitations, a single experimental group used instead of the comparisons between the two groups within and across conditions might be showed interesting differences and similarities. The researcher assumed that the Dyslexic Phonemic R3 is an initial global attempt to diagnose the reading skills at the elementary level and the outcomes frequently used, is important for processing of the different stimuli within it so that optimal learning results will come.

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