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Chapter

Oral Language Skills and Literacy Skills of Malay Children with Dyslexia

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Abstract

Dyslexia can involve among others, difficulties in spoken language. However, there is limited local data on oral language (narrative skills) and literacy skills in children with dyslexia. The relationship between language and literacy is well documented although they involve complicated and non-straightforward processes. There is also evidence suggesting a link between language difficulties with subsequent literacy difficulties. Thus, this study aims to identify and describe the language and literacy skills of Malay children with dyslexia, and to discuss the possible relationships between them. Subjects were six children with dyslexia in the Klang Valley, Malaysia aged 8:0 to 9:11 (mean age, 8:10) who were compared to an age-matched control group (n = 10). The battery of tests administrated was phonological awareness test, language task, narrative, and literacy tasks. Our findings showed that children with dyslexia had generally weaker language and literacy skills than the control group. There were significant differences ($p < .05$) in grammar understanding, sentence repetition, and reading and spelling at both word and paragraph levels. Pearson correlation between language and literacy was shown to be positive and strong, $r = .887$, $p < .05$. The qualitative discussion of the data is presented. Findings from this study would provide useful information to teachers and speech-language therapists in their teaching or planning of appropriate clinical evaluation and management of children with dyslexia.

Keywords: oral language skills, literacy skills, narrative, Malay children, dyslexia

1. Introduction

Dyslexia affects about 10–15% of primary school children in Malaysia which is similar to the prevalence rate of 10–15% of the population in the world [1, 2]. According to statistics from the Department of Special Education, Ministry of Education Malaysia, there are approximately about 500,000 children in Malaysia who are suffering from dyslexia. On average, it is reported that there is one dyslexia case being identified in every 20 students [3]. In addition, the local newspapers reported that nearly 10% of students in primary and secondary schools are affected with dyslexia [4, 5].

Dyslexia is a neurobiological impairment that primarily affects reading ability which is commonly known as a reading disorder, that is likely to be present at birth but generally identified at the preschool level [1]. Children with dyslexia have difficulties in reading, writing, and spelling despite having intelligence on par or above-average of their typically developing peers [6]. The most widely used

definition of dyslexia currently is a difficulty to identify and spell words correctly and/or fluently. The phonological deficit is the underlying factor of this difficulty [2].

Although studies on dyslexia focused more on the aspect of literacy, there is also evidence that indicated that the deficits are also in oral language particularly in the early years among children with dyslexia [7]. International Dyslexia Association (IDA) also states that oral language difficulty is one of the characteristics of dyslexia. A study showed that students with dyslexia were less eloquent, and they gave more ungrammatical and incomplete verbal answers compared to ordinary readers [8].

Thus, this chapter aims to determine the language, oral language skills, phonological awareness skills, and literacy skills of Malay children with dyslexia whose native language is Malay. An in-depth analysis will help in the identification of the capabilities and weaknesses of children with dyslexia in terms of literacy and language skills. Language difficulties can serve as a risk marker for learning difficulties and early intervention could be provided with appropriate education and rehabilitation [9]. Findings from this study can contribute to the evaluation and management of language and literacy difficulties for local Malaysian children with dyslexia.

2. Literature review

2.1 Malay language

Malaysia, a country situated in the Southeast Asia region, with a population of over 32 million, is a country with three major ethnic groups i.e., Malays, Chinese, and Indians, and a plethora of minority groups. Malaysia is a multilingual and broadly diglossic or even polyglossic country [10]. The verbal and speech repertoires of most Malaysians would include not only a native tongue or first language but also a second or further language [11]. The Malay language is the national and official language with English as the second language. Most Malaysians including Malays speak at least two languages but many particularly Chinese or Indians, speak three to five languages [12].

The Malay language or Bahasa Melayu (henceforth Malay) is a member of the Austronesian group of languages with agglutinative morphology which consists of mostly derivational and a small portion of inflection morphemes. Standard Malay is an alphabetic-syllabic writing script used in Malaysian schools. Malay has a highly transparent orthography with near-perfect and consistent grapheme-phoneme correspondences [13]. Malay has 26 alphabets like English. Malay has the following types of sounds: vowels, consonants, diphthongs (ai, au, oi). There are also diagraphs such as /gh/, /kh/. /ng/, /ny/. /sy/ with each diagraph representing the sound of an individual phoneme. Malay utilizes the morphological processes of affixation (eg. prefix *di-* in *dibuka*) compounding (eg. *rumah sakit* 'hospital', and reduplication (eg. buku-buku 'books'). Malay words are based on 4 distinct syllables i.e., V, VC, CV, and CVC. Words in Malay are formed by two or more syllables with very few monosyllabic words [14]. The most frequently occurring word structures in the Malay texts were bisyllabic with CV + CVC, CV + CV, V + CVC, and CVC + CVC word structures [15]. Most words in Malay orthography are either bisyllabic or polysyllabic.

2.2 Studies on children with dyslexia

Although dsylexia is a much-researched topic, there seemed to be no consensus yet on its diagnostic criteria. Most definitions agree, however, on a few primary

inclusionary criteria in that dyslexia is marked by difficulties with word reading, decoding, and spelling as evidenced by low accuracy and/or fluency on standardized assessments [16, 17]. One source of confusion concerns perceptions about the oral language abilities of children with dyslexia. Even though dyslexia has been described as 'language-based' but the focus has primarily been on phonological deficits as a core feature of dyslexia. There are also less clarity about the extent of other aspects of language development such as vocabulary, syntax, and discourse which are affected in individuals with dyslexia [18].

A 'Language and Literacy' Program [19], is a literacy program to support the development of oral language (vocabulary, grammar and narrative) and literacy. The study on 15 first grade dual program students was aimed at understanding the extent to which grammatical skills of bilinguals at risk for language and/or reading difficulties. Their findings showed that the intervention group had good outcomes in English and Spanish as evidenced by the significant increases in the cloze and sentence repetition accuracy. The increased productivity on their narrative skills was evidenced by their mean length utterance and overall grammaticality score. They concluded that structured intervention which includes an emphasis on grammatical elements in the context of a broader intervention can lead to change in the production of morphosyntax evident in elicited constructions and narrative productivity.

Studies on dyslexia in Malaysia have mainly concentrated on the description of difficulties Malay children with dyslexia faced in reading and writing. One case study [20] looked at Annie, a 9-year-old girl diagnosed with dyslexia with problems in the area of visual perceptual skills. She had difficulties in reversals, tracking and word recognition. The Davis Orientation Counseling Method helped to overcome Annie's dyslexic symptoms. Another study [21] investigated word recognition performance of 11 low-progress early readers in Year 1. The results indicated that both syllable awareness and phoneme blending were significant predictors of word recognition which suggested that both syllable and phoneme grain-sizes are important in Malay word recognition. A multisensory programme [22] was administered on 8- and 9-years old dyslexic students in remedial classes from 12 schools in Perak and determined its effectiveness on the identification and mastery of the alphabet. The results showed there were significant differences for alphabet identification and alphabet mastery after implementation of the programme. There was a study [23] conducted on multi-senses activities in words mastery among five dyslexic children aged 8 and 9 years. The findings revealed that the multi-senses activities provided a conducive, fun learning environment for the mastery of words among the subjects.

Another group of studies looked at development of assessment tools to assess children with dyslexia in Malaysia. A Malay reading assessment battery [24] was developed and established its validity. The test contained 10 subtests which included letter naming, word reading, non-word reading, spelling, passage reading, comprehension, listening comprehension, elision, rapid letter naming and digit span. An intervention program called MyBaca [25] was introduced which uses the grapheme phoneme correspondence multisensory strategy. The program is designed as a paper-based word recognition intervention program with tutor support and future development to a computerized format is envisaged. A recent study by another group of researchers [13], described a new comprehensive early reading assessment battery for multilingual learners in Malaysia. A total of 866 year 1 primary school students from multi-ethnic and multilingual backgrounds were tested using the newly developed tool. The reading assessment battery comprised 13 subtests. High reliability and validity were obtained for the test. An exploratory factor analysis yielded three main constructs for reading: phonological-decoding, sublexical-fluency and vocabulary-memory.

Thus far, no study on children with dyslexia in Malaysia has looked at other aspects of language development such as vocabulary, syntax, and narrative which are affected in children with dyslexia. Our study is the first study to attempt to explore the association between language, oral language, and literacy skills.

3. Methodology

This study is part of a bigger project to collect data towards the development of an adapted version of the Dyslexia Screening Test namely the Bahasa Malaysia (DST-BM). 501 students who are native speakers of the Malay language were tested in a few national primary schools in Klang Valley, Malaysia. 76 children failed the screening and were diagnosed with dyslexia by the clinical psychologists. 6 children from the 76 diagnosed were selected to be in the dyslexic group. The children were on average 8; 10 years old and consisted of five male and one female student. 10 students (five males and five females) of the same chronological age and who had no history of language problems and other risk factors as reported by their teachers were selected as the control group.

3.1 Materials and procedure

The battery of tests consisted of:

1. Malay Phonological Awareness Test [26]: Subsections include rhyming, hearing letters, segmenting words into syllables, segmenting words into phonemes, blending, isolation, and deletion.

2. Malaysian Preschool Language Assessment Test (MPLAT) [27]: Selected subtests were chosen as criterion-based tasks. Receptive language (*Picture Vocabulary*, *Grammatical Understanding*) and Expressive Language (*Sentence Repetition* task, *Referential Meaning*, *Relational Meaning*) were administered.

3. Malay Narrative Test [28] adapted from the Expression, Reception, and Recall of Narrative Instrument (ERRNI) [29]. The scoring sheet from ERRNI was used and the picture story was taken from the 'Race between Tortoise & Hare' [30]. Participants were evaluated on their ability to tell and recall stories.

4. Measures of literacy. A battery of reading tasks was administered including word and paragraph reading, reading and listening comprehension, word spelling and paragraph dictation, and copying abilities.

   a. *Word Reading:* A word list of 25 words organized at different levels of difficulties derived from [31] and the Year Two workbooks available in the market. This measures single-word reading.

   b. *Paragraph Reading:* A 141-word excerpt was modified from the storybook "Tortoise and Hare" to assess the participants' reading ability.

   c. *Reading Comprehension:* Ten questions were adapted from [28] to measure participant's reading comprehension. In this test, the students answered comprehension questions verbally.

d. *Listening Comprehension:* Five questions were created based on the text adapted from [32] to assess participant's listening comprehension. Participants listened to an audio recording reading of a paragraph and answered questions about the paragraph verbally.

e. *Word spelling:* Participants were required to write the words dictated to them. This is a list of 25 words grouped into different levels of difficulties based on the phonological structures and word lengths of the words.

f. *Paragraph dictation:* Subjects were asked to first listen to the paragraph being read. Then the tester will read aloud the phrases, sentences and subjects will write down the phrases dictated to them one after the other. After that, they checked their dictation for any spelling errors. They are allowed to correct any mistakes done.

g. *Copying:* A three-sentence paragraph developed based on the primary level one language workbooks was provided. Participants were asked to copy the sentences on the dotted lines on the sheet.

4. Results

4.1 Intelligence quotient (IQ) test and dyslexia screening test-Malay (DST-BM) performance of subjects with dyslexia

The performance of subjects with dyslexia based on the Weschler Intelligence Scale for Children- IV (WISC-IV) [33] and Dyslexia Screening Test-Bahasa Malaysia (DST-BM) [34] are shown in **Table 1**. Two subjects were at borderline (70–79), three subjects were at low average (80–89), and one subject was at average (90–109). The full-scale intelligence index was generally affected by poor performance in the Verbal Comprehension Index and Working Memory Index. They also failed in the DST-BM, indicated by their performance at the level of high risk to very high risk.

Dyslexia Subjects	S1	S2	S3	S4	S5	S6
Gender	Male	Female	Male	Male	Male	Male
Full Scale IQ	81	73	87	80	91	77
DST-M						
Rapid Naming	3	3	3	3	3	3
Phonemic Segmentation	0	1	0	1	0	1
Two Minute Spelling	3	2	2	3	1	3
Nonsense Passage Reading	3	3	3	3	1	2
One Minute Writing	0	0	1	1	3	3
Verbal Fluency	0	1	1	1	0	0
Semantic Fluency	3	3	3	3	1	2
Backwards Digit Span	0	2	0	2	2	0

**Dyslexia Screening Test – Bahasa Malaysia (DST-BM) [34]: 0–3 marks each index represents normal (0), risk (1), high risk (2), and very high risk (3).

Table 1.
The full-scale intelligence index dan DST-M index marks.

4.2 Comparison of language skills between dyslexia and control groups

Table 2 shows language performance of dyslexia (n = 6) and control group (n = 10) for each subtest of the Malay Preschool Language Assessment Tool (MPLAT). Significant mean differences in language skills were observed in grammatical understanding (r = 0.54; p < 0.05,) and sentence repetition (r = 0.71; p < 0.05).

For oral language skills (narrative test), the dyslexia group had a significant weakness (p < 0.05) in story retelling (M = 13.3, SD = 4.08) compared to the control group (M = 18.3, SD = 4.55) (see **Table 3**).

4.3 Comparison of literacy skills between dyslexia and control groups

Table 4 shows performance in literacy skills between the groups. There was a significant mean difference across the two groups in reading and spelling, at both single word and paragraph levels. Subjects with dyslexia performed poorer on single-word reading (r = 0.83; p < 0.05), paragraph reading (r = 0.66; p < 0.05), spelling (r = 0.75; p < 0.05,) and dictation (r = 0.79; p < 0.05) compared with the control group.

4.4 Comparison of phonological awareness skills between dyslexia and control groups

There was a significant mean difference (p < 0.05) between the groups at phoneme level. The dyslexia group showed significantly poor performance in phoneme segmentation (r = 0.87; p < 0.05) and isolation (r = 0.76; p < 0.05) subtests compared with the control group (see **Table 5**).

Language component	MPLAT sub-test	Control (n = 10) mean (SD)	Dyslexic (n = 6) mean (SD)	p < 0.05*
Receptive	Picture Vocabulary	38.1 (0.57)	36.5 (1.87)	0.093
	Grammatical Understanding	**18.1 (1.29)**	**16.3 (1.51)**	**0.026***
Expressive	Referential Meaning	11.0 (3.74)	7.5 (3.73)	0.091
	Relational Meaning	23.7 (3.16)	23.8 (4.26)	0.944
	Sentence Repetition	**11.0 (5.16)**	**2.5 (1.97)**	**0.003***

Significance level is at p<0.05. The results in bold show the following: 1) Grammatical Understanding score at p=0.026, and 2) Sentence Repetition at p=0.003, which is within p<0.05.

Table 2.
Mean score difference between control and dyslexia groups in MPLAT subtests.

Narrative test	Control (n = 10) mean (SD)	Dyslexic (n = 6) mean (SD)	p < 0.05*
Initial Story Telling	19.3 (5.10)	15.8 (4.99)	0.168
Story Retelling	**18.3 (4.55)**	**13.3 (4.46)**	**0.046***

Significance level is at p<0.05. The results in bold show Story Retelling score at p=0.046, which is within p<0.05.

Table 3.
Mean score difference between control and dyslexia groups in oral language skills.

Component	Literacy sub-test	Control (n = 10) mean (SD)	Dyslexic (n = 6) mean (SD)	p < 0.05*
Reading	**Reading single word**	**24.2 (1.03)**	**12.8 (6.59)**	**0.001***
	Reading paragraph	**137.8 (3.52)**	**110.8 (27.65)**	**0.007***
Comprehension	Reading comprehension	5.8 (1.75)	5.3 (1.03)	0.565
	Listening comprehension	2.7 (0.82)	2.7 (0.82)	0.875
Dictation/Writing	**Single word dictation**	**21.4 (3.95)**	**7.33 (5.50)**	**0.001***
	Paragraph dictation	**32.3 (4.02)**	**18.8 (6.18)**	**0.001***
	Copying	24.0 (1.89)	21.8 (4.02)	0.118

Significance level is at p<0.05. The results in bold show the following: 1) Reading Single Word score at p=0.001, 2) Reading Paragraph at p=0.007, 3) Single Word Dictation at p=0.001, and 4) Paragraph Dictation at p=0.001, which is within p<0.05.

Table 4.
Mean score difference between control and dyslexia groups in literacy skills.

Level	Subtests	Control (n = 10) mean (SD)	Dyslexic (n = 6) mean (SD)	p < 0.05*
Syllable	Blending	10.0 (0.00)	10.0 (0.00)	1.000
	Deletion	9.8 (0.42)	8.8 (1.17)	0.093
	Segmentation (syllable)	9.8 (0.42)	9.0 (1.67)	0.562
Rhyme	Rhyming matching	9.0 (0.94)	8.0 (1.67)	0.263
	Letter Naming	9.8 (0.42)	7.8 (2.64)	0.093
Phoneme	**Segmentation (phoneme)**	**9.8 (0.42)**	**6.5 (1.52)**	**0.001***
	Isolation	**9.9 (0.32)**	**5.7 (4.13)**	**0.005***

Significance level is at p<0.05. The results in bold show the following: 1) Segmentation (phoneme) score at p=0.001, and 2) Isolation at p=0.005, which is within p<0.05.

Table 5.
Mean score difference between control and dyslexia groups in phonological awareness.

4.5 Correlation between language and oral language skills with literacy skills of subjects with dyslexia

Table 6 shows the bivariate Pearson correlation results between literacy and language skills, and literacy and oral language skills of subjects with dyslexia. There was a strong positive correlation between language and literacy skills, r (4) = 0.911, p < 0.05 indicating that as language skills improved, literacy skills improved. However, the relationship between literacy and oral language skills was not significant despite showing positive correlation (r = 0.745; p > 0.05) and large impact size (r^2 = 0.555, p > 0.05).

4.6 Correlation between phonological awareness with literacy skills of subjects with dyslexia

The bivariate Pearson correlation was also conducted between phonological awareness with reading and spelling skills of subjects with dyslexia. As shown in **Table 7**, the

		Literacy skills	Language skills	Oral language skills (story retelling)
Literacy skills	Pearson correlation	1	0.911	0.745
	Sig. *(2-tailed)*		**0.011***	0.089
	n	6	6	6
Language skills	Pearson correlation	0.911	1	0.693
	Sig. *(2-tailed)*	**0.011***		0.127
	n	6	6	6
Oral language skills (Story retelling)	Pearson correlation	0.745	0.693	1
	Sig. *(2-tailed)*	0.089	0.127	
	n	6	6	6

*Significance level is at p<0.05. The results in bold show Literacy Skills and Language Skills score at p=0.011, which is within p<0.05.
*Correlation was significant at level 0.05 (2-tailed).

Table 6.
Pearson correlation relationship among literacy skills with language and oral language.

| Phonological awareness	Pearson correlation	1	0.737
Phonological awareness	Sig. *(2-tailed)*		0.095
	n	6	6
Reading & spelling skills	Pearson correlation	0.737	1
	Sig. *(2-tailed)*	0.095	
	n	6	6

Correlation was significant at level p<0.05 (2-tailed) in the dyslexia group for Phonological Awareness [26] and Reading and Spelling Skills tasks.

Table 7.
Pearson correlation relationship between phonological awareness and literacy skills (reading & spelling) in the dyslexia group.

result was not significant despite showing positive correlation, r (4) = 0.737; p > 0.05 and large impact size (r^2 = 0.543, p > 0.05).

4.7 Qualitative analysis of oral language skills: sentence use in the narrative by dyslexia control groups

Simple sentences were the most frequently produced sentence type by both groups of subjects, followed by coordinate sentences, complex sentences, and subordinate sentences (see **Figure 1**). The percentage of simple sentence production by the dyslexia group (77.5%) was higher than the control group (58.5%). The percentage of complex sentence production (6.25%) and coordinate sentence (11.25%) by the dyslexia group were lower compared to the control group, which produced 10.8% and 25.7% in the production of complex sentences and coordinate sentences respectively. The use of subordinate sentences was not found to be different for the two groups, with the same percentage value of 50%.

Percentage of Sentence Types Used in Narrative
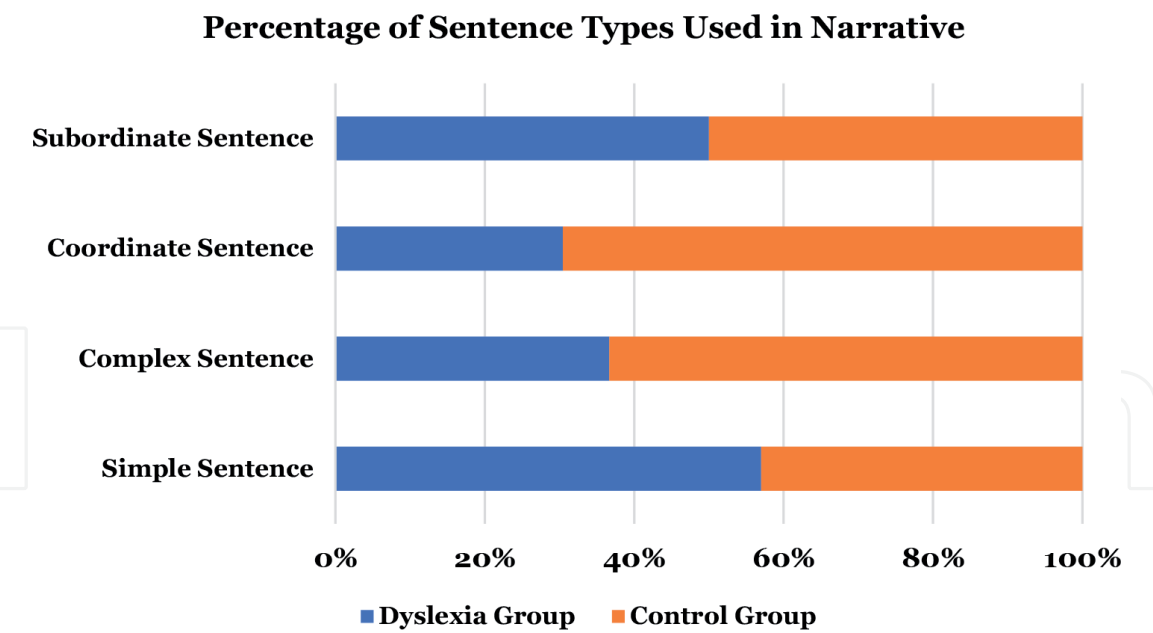
Figure 1.
Comparison of percentage of sentence types used in narrative between dyslexia and control groups.

4.8 Error analyses in narrative sample by the dyslexia group

Overall, the dyslexia group produced errors in all three language aspects. The dyslexic group made more language errors compared to the control group. The children with dyslexia produced a lot more deletion errors (**Table 8**).

4.9 Qualitative analysis of literacy skills: reading error analyses in the dyslexia group

A detailed analysis of the reading errors made by the dyslexia group was done both quantitatively and qualitatively. Quantitative descriptive analysis was used to

Language aspect	Dyslexic group	Control group
Semantics	• Substitution of major character's name • Deletion of major character's name • Substitution of noun	• Substitution of major character's name
Morphology	• Deletion of prefix • Deletion of circumfix • Substitution of prefix • Deletion of preposition • Deletion of conjunction • Deletion of pronoun • Deletion of full-reduplication	• Deletion of prefix • Substitution of prefix • Deletion of suffix • Addition of preposition • Inaccurate use of quantifier
Syntax	• Hanging sentence • Ambiguous sentence with deviate meaning • Inaccurate sentence structure • Inaccurate word order	• Hanging sentence • Inaccurate sentence structure

Table 8.
Error types in the narrative sample.

Level	Reading error types					
	Phonological	**Orthographic**	**Morphological**	**Semantic**	**Strategy**	**Others**
Word level	20.43%	10.75%	6.45%	19.35%	23.67%	19.35%
Paragraph	18.78%	14.08%	5.16%	22.54%	26.29%	13.15%

Table 9.
Percentage of reading error types by subjects with dyslexia.

compare the percentage of the type of errors at the single word and passage reading tasks among the subjects with dyslexia. Qualitative descriptive analysis was used to describe the types of errors in reading and spelling in detail in order to understand the aspects of difficulties experienced by subjects with dyslexia.

Reading errors were categorized into six types according to the reading test in Aston Index [35]: (1) phonological, (2) orthography, (3) morphological, (4) semantic, (5) strategy, and (6) other errors.

Table 9 shows the percentage of reading error types by subjects with dyslexia.

Most of the errors at the single word level were strategy errors (23.67%), followed by phonological errors (20.43%), semantic errors (19.35%), and other errors (19.35%), orthographic errors (10.75%), and morphological errors (6.45%). At the paragraph level, the major errors were strategy errors (26.29%), followed by semantic errors (22.54%), phonological errors (18.78%), orthographic errors (8.14%), other errors (13.15%), and morphological errors (5.16%).

Table 10 provides examples of reading error types.

Error type	Description	Examples
1. Phonology	Phonological errors were the words read that sounded similar to the letters of the target word (Gupta & Jamal, 2006).	tin → [tən] **mencabar → [mənsadar]*** **mencabar → [məndʒadar]*** menghadapi → [məŋhadipi]
	They tended to replace certain phonemes.	bahawa → [bahaja] gajah → [dʒadʒah] yakin → [wakin]
	They were confused between 'b' and 'd'. They were also confused by the phoneme /e/ which can exist in two phonetic pronunciations [e] and [ə] (eg. *rehat* to [rə-rehat]).	lambat → [lambau] garisan →[dʒarisan] mereka → [merəka] **rehat → [rə-rehat]****
2. Orthography	Orthographic errors were the words read that showed visual similarity to some target letters in a word (Gupta & Jamal, 2006).	buih → [buah] bahagia → [bahagian] akan → [makan] **esok → [əkor]**
	Errors made were considered similar to phonological errors (eg. *berkata* to [dərkata], *bahawa* to [dahawa], *sebentar* to [sədə-sədəntar]).	dia → [di] lambat → [lumba] bayang-bayang → [bawaŋ- bawaŋ] **berkata → [dərkata]*** **bahawa → [dahawa]*** **sebentar → [sədə-sədəntar]***
3. Morphology	Morphological errors were on the affixes (prefixes, suffixes) and function words.	penyelesaian → [məŋələsai-i] rangkaian → [raŋkai-i] berkumpul → [məŋumpul]
	Subjects faced difficulties in recognizing and reading words with a derived word (base + bound morphemes. They deleted, added, or replaced certain prefixes and suffixes.	berkumpul → [bərkumpulan] pada → [di] dengan → [di]

Error type	Description	Examples
4. Semantic	Semantic errors were the semantically incorrect words or non-words (*) which does not carry lexical meaning.	itu → [unto?] binatang → [ləmbu] mengalahkan → [məlihat] bersetuju → [bərasa] siapa → [siŋa] sampai → [siapa] keputusan → [tulisan] angin → [ambit] ikhtiar → [talan] keistimewaan → [kəfandaran] takhta → [ta?pəŋahan] tercabar → [ta?tʃəkəraN] sehinggakan → [siakan] tetapi → [səsənti]
	Children were found to substitute some words with other words or produce non-word forms (*) (eg. Binatang 'animal' to [ləmbu] 'cow', mengalahkan 'defeated' to [məlihat] 'to see', bersetuju; 'agree' to [bərasa] 'feel', ikhtiar 'initiative' to [*talan], tetapi 'but' to [*səsənti], angin to [*ambit]).	
5. Strategy	Strategy errors were words that were read with repetitions and/or segmentations (eg. *angin* to [an-gin], *dataran* to [datar-an], *iklan* to [i?-lan]).	**angin → [an-gin]** **dataran → [datar-an]** **iklan → [i?-lan]** **penyelesaian → [pən ɲələsai-sai-in]** **rangkaian → [raŋka- raŋkai-an]** Arnab → [ara-ra-nab-arnab] lengan → [lingan- ləŋan] lengan → [ləm- ləŋan] garisan → [gasi-garisan] petang → [hari- pətaŋ] **setapak → [sətapa?-sə-tap- sətapa?]**
	The subjects performed poorly in segmenting multisyllabic words. They tended to repeat the syllables while segmenting them (eg. *penyelesaian* to [pən-ɲələsai-sai-in]).	
6. Others	Other errors included words that were read by reversals, abbreviations and addition of phonemes and/or syllables (eg. *keistimewaan* to [kəsitimewaan], *bahawa* to [bawa], *tarikh* to [takitah]). At paragraph level, errors such as skipping the lines or adding own words were included in this category.	kenderaan → [kendaan] bahawa → [bawa] waktu → [waku] tarikh → [takitah] **keistimewaan → [kasitimewaan]**

represents ungrammatical forms or words and non-words in Malay.

Table 10.
Examples of types of reading errors produced by subjects with dyslexia.

4.10 Spelling error analyses in the dyslexia group

Spelling errors at the single word and paragraph levels involve phonologically plausible errors to bizarre spelling errors. There was a letter reversal of 'b' with 'd', inappropriate use of big and small letters within the words, eg. *aKan*, *memBasuh*, and inaccurate use of punctuation.

4.11 Copying analyses in the dyslexia group

Most errors in the copying task included omission of punctuations, presence of capital letters within a word, and small letters for names. They also omitted a few words and graphemes. However, the subjects with dyslexia did not inverse between the letter 'b' and 'd' as noted in reading tasks. They either copied the correct punctuations or omitted them. They were found to place punctuations in front of words when there was not enough space to write.

Subject	Language (%)	OLSR (%)	Literacy (%)				PA (%)	RCt
			R	S	RC	LC		
S1	58.27	23.21	55.42	26.23	50.00	20.00	77.14	Poor
S2	57.55	12.50	44.58	31.15	40.00	20.00	74.29	Poor
S3	67.63	33.93	93.98	63.93	50.00	60.00	91.43	Good
S4	61.15	26.79	80.12	22.95	70.00	60.00	74.29	Moderate
S5	71.94	26.79	95.18	65.57	50.00	80.00	90.00	Good
S6	59.71	19.64	77.71	47.54	60.00	60.00	71.43	Moderate

Denotes as: R (Reading), S (Spelling), OLSR (Oral Language: Story Recalling) [29], RC (Reading Comprehension, LC (Listening Comprehension), PA (Phonological Awareness) [26], RCt (Reader Category).

Table 11.
The percentage scores and reader category for each subject with dyslexia.

4.12 Individual profile of language and literacy skills of subjects with dyslexia

The percentage of individual scores for each of the subjects in the dyslexia group is presented in **Table 11** to provide a clearer picture of each child individual's language and literacy skills. Subjects with dyslexia were categorized into good readers (a percentage score between 90% - 100%), moderate readers (a percentage score between 70% - 90%), and weak readers (40% - 70%) with regard to the achievement of their reading and phonological awareness.

In the good reader category, achievement of language, oral language, spelling, and listening comprehension for both subjects with dyslexia (S3 & S5) were the highest in the dyslexic group. S5 had better listening comprehension skills but weaker oral language skills than (S3).

In the moderate reader category, the fourth dyslexic subject (S4) obtained the highest scores in the reading comprehension test, but the lowest was in the spelling test. The sixth dyslexic subject (S6) had better marks in spelling and oral language tests than S4 subject.

In the poor reader category, the first dyslexic subject (S1) obtained higher achievement in language, oral language, and reading comprehension tests, but lower achievement in the spelling tests compared to S2 subject.

5. Discussion

Malay children with dyslexia (mean age 8:10 years old) in this study showed poor language skills, weak oral language skills (story retelling), and poor literacy skills compared to the control group subjects.

Overall, based on the standardized language tool MPLAT, the performance of the children with dyslexia was poorer than the control group children particularly in the Grammatical Understanding and Sentence Repetition subtests. This is supported by [36] who studied children with dyslexia at the age of 9 years old and found that they showed significantly poor vocabulary, sentence repetition, and syntactic comprehension compared to the typically developing children. In the case of children with dyslexia, they performed significantly poorly in grammar because they tend not to focus on the morpho-syntactic features of the text [37]. A study by [38] reported that several studies [39, 40] have shown that spoken language skills in young familial risks of dyslexia (FRdys) children produce shorter sentences of lower syntactic complexity and achieve lower vocabulary scores than low-risk children. In addition, when school-aged children with dyslexia or FRdys children

are compared to their typically developing peers, they are found to achieve lower scores on standardized tests of grammar (e.g., the Clinical Evaluation of Language Fundamentals (CELF). It was also reported that preschool-aged children with dyslexia performed poorly in the comprehension of sentences [41] and the correct interpretation (and production) of complex syntactic structures such as passive sentences [42]. In typically developing children, the developmental pattern in reading is that younger children would rely heavily on semantic cues while the older children focused more on the morpho-syntactic cues [43]. Therefore, the deficiency in morpho-syntactic knowledge and skills are associated with poor language skills.

A significant weakness found in the sentence repetition task for dyslexic subjects compared to the control group is because children with dyslexia have impaired verbal short-term memory and poor phonological memory. Verbal short-term memory impairment is one of the most consistent associated deficits observed in developmental reading disorders such as dyslexia [44]. Previous studies have reported that short-term memory contributes to sentence repetition abilities, and phonological memory is also related to sentence repetition [45]. Linguistic knowledge appears to be an important determinant of verbal short-term memory [44]. If linguistic representations are poorly developed, verbal short-term memory performance will be directly impacted. In the case of dyslexia, this means that verbal short-term memory impairment could be a consequence of the phonological processing impairment which characterizes dyslexia [44]. All these features correspond to the characteristics of dyslexia seen in dyslexic subjects in this study. They have a very low short-term memory index based on the cognitive test results and were found to have a high-risk index in verbal and semantic fluency tests in the dyslexia screening test DST-BM. Their errors in the sentence repetition task included deletions, substitutions, and word order movement. The grammatical proficiency exhibited in sentence repetition does not exceed the grammatical proficiency exhibited in spontaneous language after the age of six years [19]. Children with poor phonological memory will tend to drop and add words as well as confused with word order in sentences [45]. Thus, the findings of this study show weakness in grammar understanding which in turn contribute to weaknesses in language skills.

The oral language skills of subjects with dyslexia were significantly poor during the story retelling task compared to the control subjects, however, no significant difference was observed in initial storytelling. This indicated that the abilities of the dyslexic subjects were equivalent to the control subjects. However, dyslexic children were found to show poor memory, thus the plot of the story retelling had incomplete content and poor elaboration which resulted in the lack of cohesion, no climax, and a brief and shortened storyline. Dyslexic children seemed to have verbal memory deficits even though they were able to appreciate and convey the gist of the story. Certain components of memory are important for the development of reading skills, especially orthographic memory and short-term phonological memory [46]. This lack of basic cognitive function can contribute to reading disorders which are consistent with the performance of the dyslexic subjects in this study which is supported by the achievement scores of the cognitive test results in the DST-BM, and the language skills findings from the MPLAT.

There was a deficit of language skills noted during the story-telling task among subjects with dyslexia. They tended to use more simple sentences and fewer complex and coordinated sentences compared to the control group subjects. Their skills are similar to the storytelling abilities of preschoolers. Young children seemed more likely to use simple syntactic structures rather than compound or complex sentences in story retelling [47]. Overall, the results of the analysis of the narrative structure and language use of dyslexic children in this study showed that children can produce enough information in retelling activities even if the language used

is less complex in terms of its syntax. Coherence can be achieved in story retelling without the use of complex sentences. Unlike conversational activities, retelling activities not only require high-level language processing skills but also involve the understanding and use of narrative macrostructures needed to produce stories.

In studying narrative skills of 5 years and 6 years old Malay children, it was noted that children's narrative skills increased with the increase in age and language development [47]. Results from our current study showed that children of the control group of the same age were indeed able to produce sentences with a dense and complex morpho-syntactic structure. Error analysis on children with dyslexia showed weaknesses in terms of sentence use, and deficits in the semantics, mor-phological, and syntactic aspects compared to the control group children. This is consistent with the findings that children with specific literacy difficulties/reading disorders also show impaired language ability in terms of semantics, morphology, and syntax [37, 48]. A female dyslexic subject in this study produced a narrative in a dialog format. She demonstrated her creativity by taking on the roles of the char-acters of the tortoise and rabbit and gave comments on the location of the setting, described the feelings of characters in the story, etc. This dyslexic child in this study exhibited great imagination that involves the production of language-related images or experiences from memory to form new images and to bring life to the story.

This study also showed that there were differences in literacy skills between the two groups of subjects. Subjects with dyslexia had significant weaknesses in literacy skills especially in reading and spelling compared to the control group children of the same age. In reading and listening comprehension, it was found that dyslexic children showed similar achievement to children of the same age, but with lower mean score differences, 0.5 and 0.2, respectively. This is in line with [24], in testing Malay children in Year 1 at a few primary schools in the Malaysian northern state of Penang and found that decoding and listening comprehension made separate con-tributions to reading comprehension with decoding as the more prominent predic-tor. Four factors: phonological decoding, phonological naming, comprehension, and short-term memory were specifically found to be problematic for Malay children with dyslexia. Their reading and spelling errors showed articulation/spelling errors which resulted in implausible phonological words to non-word forms. They read aloud words based on incorrect syllable segmentation. These difficulties were also reported by [21] that poor Malay readers used grapheme-phoneme strategies to read rather than the direct access whole word recognition strategy when spelling the word *padat* 'tight/full' → *padan* 'suitable' or *tangga* 'staircase' → *tangan* 'hand', *hospital* → *sospital, and *selendang* 'scarf' → *seledang*. Even with a transparent lan-guage such as Malay, children with dyslexia faced difficulties due to the presence of diphthongs (ai,au,oi), diagraphs (gh,kh,ng,ny,sy), and derived words via affixation. Our findings on the difficulties of Malay children with dyslexia in dealing with the different grain sizes of phonemic and syllabic sound units is also supported by [25] in the development of *MyBaca*, a Malay language word recognition intervention program for Malay children with dyslexia, and stated that this difficulty leads to partial grapheme-phoneme connection in memory. The literacy results of this study are in line with the definition of the IDA, that dyslexia is characterized by difficulty in reading accurately and/or fluently, spelling, and decoding words.

Contrary to most studies, our finding showed that there was no significant correlation between phonological awareness skills and literacy skills (reading and spelling) in this study. One factor might be the materials used which on one hand was the Phonological Awareness Test [26] which mainly has words 1–3 syllables and was originally developed for preschool children. This is in contrast to [14] which stated that the majority of Malay words are multisyllabic words. The spelling of single words on the other hand was a compilation of words taken from materials for

the Level 1 Primary School books, dictionaries, etc. Therefore the disparity of the results might have been due to this.

Nevertheless, it is observed that the other results were similar to previous studies such as children with dyslexia made segmentation errors at the syllable level during reading. Children with dyslexia were still unable to correctly identify syllable structures based on their reading errors. Children with dyslexia can segment words with simple syllable structures. Still, they struggle with words containing digraphs (such as *singa* 'lion'), vowel clusters (such as *cuaca* 'weather'), and diphthongs (such as *rangkaian* 'network' and derived words with affixation. Although they did not show a significant difficulty at the syllable level in the phonological awareness test compared to children in the control group, these reading errors revealed that they were still unable to blend syllables and identify letter-sound relationships, particularly diagraphs and vowel clusters at the sentence and paragraph levels. This is supported that both syllable awareness and phoneme blending are significant predictors of word recognition and spelling at syllable and phonemic levels [21, 49]. They attributed it to the method of instruction in schools by teachers which emphasized syllable-level processing when decoding. They emphasized that fine-grain processing at the phoneme level is still important for word recognition.

The profiles of readers with dyslexia presented in **Table 11** shows three levels of readers – good readers (70–90%), moderate readers (70–90%), and poor readers (40–70%). The good readers such as reader S5 had the highest scores for spelling, reading, and phonological awareness (PA) skills whereas S3 had the highest score in reading, PA, and language. Poor readers such as S1 had the lowest scores in oral language, spelling, and listening comprehension. Another poor reader S2 had the lowest scores in oral language, spelling, listening comprehension, reading comprehension, and reading. This could be equated with [25] partial alphabetic readers and non-readers in the pre-alphabetic phase where they learn more about letter-sound connection and are able to partially link spelling of words to pronunciation in memory. Clearly, the goal of dyslexia intervention is to help them to move quickly out of the partial phase into the full alphabetic phase [25].

6. Clinical implication

There are numerous dyslexia intervention strategies, with the majority of them focusing on phonological awareness skills, reading and spelling, mainly the decoding and encoding strategies. While phonological awareness skills, reading and spelling skills are equally important, we cannot overlook the importance of language. We now understand a lot about language learning and its effects on literacy and academic achievement. The fact that language and literacy are interconnected, and most interventions focus exclusively in reading and writing strategies, it is critical to incorporate vocabulary instructions, morpho-syntax instructions, and comprehension processes while working on phonological awareness, letter-sound decoding and encoding, as all of these components are necessary for letter-sound knowledge to matter. If children with dyslexia receive only intervention in reading and spelling strategies, even if they develop the ability to decode and encode letter sounds, there will be a significant breakdown in reading comprehension skills which is required in order to be a skilled reader, especially among children with dyslexia whose language skills are less developed and as they progress onwards to upper grades in school with higher demands from the curriculum in terms of higher language load and complex subject content matter.

For speech-language therapists who manage school-aged students with dyslexia and want to undertake literacy intervention, it is time to consider language-literacy

intervention. Reflection on existing practise is necessary, all the more so when there is a communication gap between medical and educational views on dyslexia intervention. While working on language-literacy intervention, speech-language therapists must make connections between the structures they intervene in the clinical setting with classroom discourse and textbook language. Besides that, rather than relying on standardized assessment instruments and intervention programmes, speech-language therapists must go above and beyond their duties in order to fulfill the diverse needs of students with dyslexia, while at the same time striving hard to keep updated on the current education curriculum and learning needs.

7. Limitations and future directions

It is important to note several limitations related to the present findings, which include several participant factors and the measures utilized. The number of participants in the study is small. Measures utilized were more general measures of morphosyntax and language use rather than measures developed specifically to capture response to intervention targets.

Future studies should consider the overall aspect of language structures and language use which are also deficit in children with dyslexia such as story retelling, relating experience, grammar (morphosyntactic structures), aside from decoding and encoding words. It is practical and functional for children with dyslexia to not only know how to decode (read, spell) words but also be able to expand this ability into other domains of language. A contextualized single-language approach to intervention appears to be a promising approach to promote changes in children's language skills across the targeted languages. More research should be focused on these aspects.

Conflict of interest

The authors declare no conflict of interest.

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