



Knowledge of Dyslexia among Teacher Trainees in Malaysia

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ABSTRACT

Teacher trainees are a critical group of professionals responsible for identifying students with dyslexia in schools. This study aimed to examine the common understanding and misconceptions concerning dyslexia among Malaysian primary school teacher trainees. The study was conducted using a set of questionnaires known as the Knowledge and Belief about Developmental Dyslexia Scale (KBDDS) developed by Soriano et al. (2015) to investigate teachers' general knowledge, symptoms and diagnosis, and treatment of dyslexia. The questionnaire consists of 36 questions that require a true or false answer. Ninety-nine teacher trainees participated in the study. The results showed that there was a moderate proportion of teacher trainees who were not familiar with dyslexia in terms of general information (34%, $n = 39$), symptoms and diagnosis (23%, $n = 23$), and treatments (32%, $n = 32$). Based on the results, we can conclude that there were teacher trainees who were unfamiliar with dyslexia regarding the general information, symptoms and diagnosis, and treatments. Teacher trainees need to master every aspect of dyslexia because it will help them to enhance their skills in teaching students with dyslexia. This study's implication for improving pre-service teacher training programs for preparing teacher trainees to master the issues related to learning disabilities, special education, and especially dyslexia are discussed.

Keywords: dyslexia, misconceptions, knowledge, primary school, teachers

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1 INTRODUCTION

1.1 Dyslexia

Globally, the prevalence rate of children who display the symptoms associated with dyslexia varies from 5 to 17.5% (Borleffs et al., 2019). Dyslexia has serious consequences, especially for students' literacy performance (Ministry of Education [MOE], 2019a). The Ministry of Education of Malaysia data reported that the number of students diagnosed with dyslexia in 2019 was 12,419 (MOE, 2019a). The number of students with dyslexia has increased to 13,302 in 2020 (MOE, 2020). With the rising number of students diagnosed with dyslexia annually, every teacher must possess the necessary knowledge of the signs and treatments of dyslexia.

Dyslexia is a specific learning disability that causes reading difficulties, including understanding spoken sounds and how letters and words are connected. Besides, basic abilities such as reading, writing, speaking, and listening may be affected due to dyslexia (Ramli et al., 2019). The latest 21st definition of dyslexia is codified in U.S. law (PL 115-391) as an unexpected reading difficulty for an individual with the intelligence to be a much better reader (Shaywitz & Shaywitz, 2020, p. 465). Dyslexia is also known as a specific learning disability (SLD). SLDs comprise a broader group of academic challenges in the spoken and written language and math (Grigorenko et al., 2020). According to the International Dyslexia Association (IDA, 2002):

Dyslexia is a learning disorder caused by a neurobiological problem. It is marked by problems with correct and/or fluent word recognition, as well as poor spelling and decoding skills. These difficulties are usually caused by a phonological aspect of language deficiency, which is sometimes unanticipated in comparison to other cognitive abilities and the availability of appropriate classroom instruction. Problems with reading comprehension and a lack of reading experience can stifle the development of vocabulary and context information as secondary consequences.

Given that dyslexia is a high incidence specific learning disability that occurs commonly among school children, teachers, in addition to parents, are accountable for the early detection of dyslexia among students (Soriano et al. 2015).

1.2 Teachers' knowledge and misconceptions about dyslexia

Students with dyslexia struggle with phonological awareness (Johnston, 2019). They have difficulty differentiating specific sounds, syllables, and words in sentences, as well as rhyming. Children with dyslexia have trouble differentiating and blending phonemes, which are the separate sounds and smallest units of the sounds (Williams & Lynch, 2010). Law et al. (2018) conducted a study to examine the learning of new grapheme-phoneme correspondences in individuals with and without dyslexia among 84 third-grade students with dyslexia who were all Dutch native speakers. The findings showed that children with dyslexia were less able to decode sentences using newly

learned phoneme-grapheme rules. were less able to decode sentences using newly learned phoneme-grapheme rules.

According to Ramli et al. (2019), most Malaysian preschool educators perceive that students with dyslexia are slow learners, lazy, and deprived of the necessary reading exposure at home, resulting in the student's difficulties in reading, speaking, writing, and/or listening. Thus, Ramli et al. argued that preschool educators held misconceptions in their beliefs as educators regarding why children experienced reading difficulties in school. It is similar to a study by Daley (2020), who reported that teachers in the northeastern state of America were unable to determine whether a child was struggling in reading and writing due to developmental issues or whether it was a characteristic of dyslexia.

In their study on teachers' misconceptions about dyslexia, Soriano and colleagues described misconceptions about dyslexia as incorrect responses on several vital domains such as general information, symptoms/diagnosis, and treatment of dyslexia. Examples of these misconceptions include the following: dyslexia is a consequence of poor visual processing rather than phonological processing, reversals of letters or words, coloured or tinted lenses or overlays can help children with dyslexia, dyslexia can be cured, dyslexia is not inherited, and all individuals with dyslexia exhibit the same severity (Soriano et al., 2015, see also Table 2). Such misconceptions and lack of knowledge may harm students with dyslexia, especially regarding their academic achievements and emotions (Ramli et al., 2019). Moreover, the teachers may apply inefficient and unsuitable teaching approaches for teaching children with dyslexia due to their limited understanding of dyslexia (Nadelson et al., 2019).

1.3 Teachers' preparedness to teach students with dyslexia

Teachers play an essential role in recognizing students with dyslexia in minimizing the growing number of students at risk of dyslexia in the classroom and schools (Parry, 2015). In Spain, 83.5 per cent of in-service teachers in a study conducted by Soriano et al. (2015) indicated that they had received insufficient training to handle students with dyslexia. This data is worrying because teachers are the most significant front liners who play a crucial role in addressing the needs of students with dyslexia. Other studies report similarly worrying trends. For example, previous research on the relationship between teachers' perception and their training experiences regarding dyslexia found that most teachers from England and Wales acknowledged that dyslexia was not covered well.

In contrast, a significant majority of respondents (71.8 per cent) reported that dyslexia was not covered well in their training program during their initial teacher education program (Knight, 2017). Similarly, a study by Nijakowska (2019) reported that foreign language teachers in Poland have little knowledge and understanding of the learning challenges faced by children with dyslexia and that during their initial training, they were either not given any or received limited training on dyslexia, special education needs (SEN), and inclusion. In recent years, a neighbouring country of Malaysia, namely Singapore, has mooted the idea of improving the teacher professional development programs so that teachers are trained and provided with in-house support on their

knowledge, abilities, and confidence in teaching children with dyslexia (Abdullah & Benjamin, 2019). Hence, teacher trainees should receive the necessary pre-service training on teaching children with dyslexia.

1.4 Malaysian Primary School Teachers' Knowledge of dyslexia

A study on Malaysian teachers has shown that most teachers have undergone basic dyslexia training (Ramli et al., 2019). However, several flaws in the analysis need to be addressed, such as misconceptions and lack of information on dyslexia. The results demonstrated that Malaysian teacher trainees' knowledge of dyslexia is still inadequate due to the lack of training programs on dyslexia. Furthermore, reading and numeracy skills among students with dyslexia remain worrisome in Malaysia (Ramli et al., 2019). In a recent study, Lee et al. (2020) found that 24-35% of the first graders in Malaysia were at risk of reading difficulties depending on the reading abilities that were assessed. Given the rising number of students with dyslexia which has increased over the years, intervention at an early age is crucial. According to the Malaysian Ministry of Education (2013), every teacher needs to be equipped with the basic knowledge of special education due to the rising number of students (i.e., 75%) with special needs who will be enrolled in inclusive programs by 2025. Although there is abundant research on students with dyslexia and teachers' perceptions regarding dyslexia internationally, very few studies have examined Malaysian primary school teacher trainees' knowledge about dyslexia.

Given these research gaps, this study aimed to examine Malaysian primary school teacher trainees' understanding and misconceptions about the facts and symptoms of dyslexia. We addressed three main research questions in the present study.

1. What do primary school teacher trainees in Malaysia know about dyslexia?
2. What misconceptions do primary school teacher trainees in Malaysia have about dyslexia?
3. What is the prior knowledge that primary school teacher trainees in Malaysia have regarding the symptoms, diagnosis, and treatments of dyslexia?

2 METHOD

2.1 Research Design

A descriptive research design was employed in this study (Creswell & Creswell, 2018). The data collected was based on the Knowledge and Beliefs about Development Dyslexia Scale (KBDDS; see Instruments). The quantitative data collected via the KBDDS were then inspected for missing data. There were no missing data in this study. The data analysis method used in this study was descriptive statistics.

2.2 Participants

The participants were randomly recruited from teacher training institutions such as the Teachers' Training Institute (*Institut Pendidikan Guru* [IPG]) via an online platform (see Procedure). Based on the latest statistic on schools, students, and teachers by the Ministry of Education, the population of primary school teachers' trainees in 2019 was 2253 (MOE, 2019b). Based on this data, the sample size of teacher trainees targeted for this study was 196, with a 95% probability of sampling confidence level. However, only 99 teacher trainees participated in the survey (see Limitations). Of the 99 teacher trainees, 82 were female and 17 male, ranging from 19 to 24 years old. The participants came from different fields of study (see Table 1).

2.3 Instruments

The instrument will be the indicator to measure teachers' knowledge of general information, symptoms, and treatment of dyslexia that can lead to misconceptions of dyslexia. The Knowledge and Beliefs about Developmental Dyslexia Scale (KBDDS) questionnaire from Soriano et al. (2015) was adapted to measure teacher trainees' general knowledge, symptoms and diagnosis, and treatments of dyslexia. The questionnaire used in this study comprised two sections: Part A on the demographics data of teacher trainees and Part B on their knowledge and beliefs on dyslexia based on the adapted KBDDS¹. The Knowledge and Beliefs about Developmental Dyslexia Scale (KBDDS) have 36 items that focus on general knowledge (17 items), symptom and diagnosis (10 items), and treatments for dyslexia (9 items). Each item was presented in the true or false format.

2.4 Procedure

Before the actual study, a pilot study was carried out on three primary school teachers teaching students between 7 and 9 years old. The teachers were required to read the instructions as a guide to the exploratory investigation (see Appendix A) before they could answer the questions in the following sections (e.g., sections A to D). Given that the questionnaire was administered via an online platform, this approach helped ensure that the teachers understood the instructions before proceeding to the actual questionnaire on the KBDDS. The KBDDS includes items on the general information, symptoms, diagnosis, and treatment of students with dyslexia. Each item in KBDDS comprised a statement about dyslexia. Each respondent was expected to mark with a dash whether

¹ We used all the items from the KBDDS but only employed either a true or false option for the respondent to answer. The original KBDDS had three options: true, false, and do not know.

a statement was true or false about dyslexia (see sections B to D in Appendix A). Every statement had a pre-determined correct answer. The first author collated all responses from all 99 participants and then compared their answers to the pre-determined correct answer for each of the 36 statements (see Table 2-4). A "True" answer means that the statement is the correct answer and indicates that the respondents were knowledgeable about dyslexia. Conversely, a "false" answer means that it was inadequate information and indicated that the respondents held misconceptions about dyslexia. This format makes it possible to differentiate between what teachers knew and their incorrect beliefs (i.e., misconceptions) about dyslexia (Soriano et al. 2015).

The administration of the KBDDS to primary school teacher trainees was carried out from 12 April 2021 until 7 October 2021 using an online platform, Google Forms. The questionnaire was disseminated online via email platform. The survey took approximately 15 minutes to answer.

Before the research on primary school teacher trainees was conducted, the study protocol and details involving human participants were reviewed and approved by the Ministry of Education Malaysia's Division on Planning and Educational Research. We sought this approval via the Educational Research Application System. Subsequently, we also sought the approval of the State Education Office. Written informed consent to participate in this study was provided by the participants. The primary school teacher trainees were informed that their participation would contribute to the advancement of this study, and there would be no interruption to their class activities.

Results

Respondents of this study were 99 primary school teacher trainees. The age of the participants ranged from 19 to 24 years old. Descriptive statistics comprising frequency and percentage are presented in Table 1.

Table 1: Demographic table.

Variable (N = 99)	Frequency (<i>n</i>)	Percentage (%)
Gender		
Male	17	17
Female	82	83
Age		
19	1	1
20	34	34
21	18	18
22	28	28
23	9	9
24	9	9

Responsibilities		
Teacher Trainee	99	87
Field of Study		
Malay language	10	10
English language	8	8
Mathematics	10	10
Science	5	5
History	17	16
Geography	4	4
Islamic Education	13	12
Arabic Language	1	1
TESL	2	2
Design and Technology	3	3
Moral Education	1	1
Guidance and Counseling	6	6
Health Education	1	1
Visual Arts Education	6	6
Early Childhood Education	10	10
Learning Disability	1	1
Special Needs Education	7	7

Table 2: Teacher trainees' general knowledge about dyslexia.

No.	Items	Knowledgeable	Misconception	Correct Answer
1	Dyslexia is a neurologically based disorder.	96 (97%)	3 (3%)	True
2	Dyslexia is caused by visual perception deficits resulting in reversals of letters and words.	2 (2%)	97 (98%)	False
3	A child can be dyslexic and gifted.	97 (98%)	2 (2%)	True
4	Most children with dyslexia usually have emotional and/or social problems.	87 (88%)	12 (12%)	True
5	The brains of people with dyslexia differ from those without dyslexia.	81 (82%)	18 (18%)	True
6	Dyslexia is hereditary.	29 (29%)	70 (71%)	True
7	Most studies indicate that about 5% of school-age students have dyslexia.	92 (93%)	7 (7%)	True
8	Dyslexia is more frequent in males than females.	78 (79%)	21 (21%)	True
9	All poor readers have dyslexia.	87 (88%)	12 (12%)	False
10	Students who have reading disabilities without an apparent cause (e.g., intellectual disabilities, absenteeism,	34 (34%)	65 (66%)	True

	inadequate instruction) are referred to as dyslexic.			
11	Children with dyslexia are not stupid or lazy. Being knowledgeable about dyslexia can help them.	96 (97%)	3 (3%)	True
12	I think dyslexia is a myth, a problem that does not exist.	95 (96%)	4 (4%)	False
13	Problems in establishing laterality (body schema) are the cause of dyslexia.	60 (61%)	39 (39%)	False
14	Dyslexia refers to a relatively chronic condition that is usually cannot be completely overcome.	28 (28%)	71 (72%)	True
15	Many students with dyslexia continue to have reading problems as adults.	38 (38%)	61 (62%)	True
16	Many students with dyslexia have low self-esteem.	85 (86%)	14 (14%)	True
17	Dyslexia usually lasts a long time.	27 (27%)	72 (73%)	True
	Total average percentage	60 (66%)	39 (34%)	

The descriptive statistics of the 17 items for general knowledge of dyslexia are presented in Table 2. Sixty-six per cent of the respondents ($n = 60$) possessed general knowledge about dyslexia. These participants had the most common correct answer to the following questions: *Dyslexia is a neurologically based disorder* (97%, $n = 96$); *A child can be dyslexic and gifted* (98%, $n = 97$); and *I think dyslexia is a myth, a problem that does not exist* (96%, $n = 95$). Thirty-four per cent of the respondents ($n = 39$) demonstrated a lack of general knowledge of dyslexia, with the most common misconception regarding dyslexia when asked the following questions: *Dyslexia is caused by visual perception deficits resulting in reversals of letters and words* (98%, $n = 97$) and *Dyslexia usually lasts a long time* (73%, $n = 72$).

Table 3: Knowledge of the diagnosis of dyslexia among the teacher trainees.

No.	Items	Knowledgeable	Misconception	Correct Answer
1	Generally, children with dyslexia have problems with phonological awareness (e.g., the ability to hear and manipulate sounds in language).	68 (69%)	31 (31%)	True
2	People with dyslexia have below-average intelligence.	70 (71%)	29 (29%)	False
3	Students with dyslexia often read with inaccuracy and lack of fluency.	95 (96%)	4 (4%)	True
4	Reversing letters and words is the main characteristic of dyslexia.	1 (1%)	98 (99%)	False
5	Difficulty with phonological processing of information is one of the major deficits found in dyslexia.	86 (89%)	13 (11%)	True
6	Intelligence tests are useful in identifying dyslexia.	76 (77%)	23 (23%)	True
7	Children with dyslexia have decoding and spelling problems, but not listening comprehension.	91 (92%)	8 (8%)	True
8	Applying an individual reading test is essential in diagnosing dyslexia.	88 (89%)	11 (11%)	True
9	Children with dyslexia generally tend to be poor spellers.	92 (93%)	7 (7%)	True
10	Dyslexia is characterized by difficulties in learning to read fluently.	90 (91%)	9 (9%)	True
	Total average percentage	76 (77%)	23 (23%)	

Table 3 presents 10 symptoms and diagnoses of dyslexia. Approximately 77% of the respondents ($n = 76$) were knowledgeable about the symptoms and diagnosis of dyslexia with the most common correct answer for three main questions: *Students with dyslexia often read with inaccuracy and lack of fluency* (96%, $n = 95$); *Children with dyslexia generally tend to be poor spellers* (93%, $n = 92$); and *Dyslexia is characterized by difficulties in learning to read fluently* (91%, $n = 90$). On the contrary, 23%, ($n = 23$) of the respondents scored low on symptoms and diagnosis of dyslexia with the most common misconception for the following questions: *Reversing letters and words is the main characteristic of dyslexia* (99%, $n = 98$) and *People with dyslexia have below-average intelligence* (29%, $n = 29$).

Table 4: Knowledge of the treatment of dyslexia of the teacher trainees.

No.	Items	Knowledgeable	Misconception	Correct Answer
1	Modeling fluent reading is often used as a teaching technique.	95 (96%)	4 (4%)	True
2	Children with dyslexia can be helped by using colored lenses/colored overlays.	26 (26.3%)	73 (73.7%)	False
3	Physicians can prescribe medications to help students with dyslexia.	52 (52.5%)	47 (47.5%)	False
4	Multisensory instruction has been shown to be an ineffective teaching method for treating dyslexia.	57 (57.5%)	42 (42.5)	False
5	Giving students with dyslexia accommodations, such as extra time on tasks, shorter spelling lists, special seating close to the teacher, is unfair to other students.	67 (67.6%)	32 (32.4%)	False
6	Intervention programs that emphasize phonological aspects of language with letters as visual support are effective for students with dyslexia.	95 (96%)	4 (4%)	True
7	Most teachers receive specific training to work with dyslexic children.	21 (21.1%)	78 (78.9%)	False
8	Techniques involving repeated reading of material (e.g., words, sentences, or texts) help to improve reading fluency.	95 (96%)	4 (4%)	True
9	Students with dyslexia need structured, sequential, direct instruction in basic skills and learning strategies.	98 (99%)	1 (1%)	True
	Total average percentage	67 (68%)	32 (32%)	

Table 4 presents the trainee teachers' knowledge regarding the treatments of dyslexia. Approximately 68% ($n = 67$) of the respondents understand the treatments of dyslexia with the most common correct answer for three main questions which are *Students with dyslexia need structured, sequential, direct instruction in basic skills and learning strategies* (99%, $n = 98$); *Intervention programs that emphasize phonological aspects of language with letters as visual*

support are effective for students with dyslexia (96%, n = 95); and Techniques involving the repeated reading of material (e.g., words, sentences, or texts) help to improve reading fluency (96%, n = 95). However, 32.4% (n = 32) of the respondents had misconceptions regarding the treatment as they scored low on knowledge of the right treatment with the most common misconception being as follows: Most teachers receive specific training to work with dyslexic children (78.9%, n = 78) and Children with dyslexia can be helped by using colored lenses/coloured overlays (73.7%, n =73).

3 DISCUSSION

The present study examined Malaysian primary school teacher trainees' knowledge and misconceptions about the general information, symptoms, diagnosis, and treatment of dyslexia. The study also addressed the importance of every educator having adequate knowledge of dyslexia to ensure that every student with dyslexia experiences a better learning opportunity to thrive and flourish academically and psychologically. This is supported by Yin, Joshi, and Yan (2020). They reported that special education need (SEN) teachers identified at-risk students more accurately than the classroom teachers. SEN education provides SEN teachers with both theory and practice, such as evidence-based knowledge, assessment tools, and reading and writing support for individuals. Hence, teachers with SEN knowledge have exposure to special needs students. However, the present findings suggest that teacher trainees have common misconceptions about dyslexia that may derail their ability to provide the best possible educational experience and intervention for children with dyslexia.

In terms of teacher trainees' general knowledge regarding dyslexia, the result from the present study is similar to findings from a past research where pre-service teachers had less accurate knowledge about the neurological and genetic etiology of dyslexia and about the chronicity of reading disabilities across the life span than in-service teachers who had a long experience teaching and engaging with students (Soriano et al. 2015). The findings from the present study revealed that teacher trainees knew more about the ability to hear and manipulate sounds in language for students with dyslexia. Still, most of the teacher trainees had a misconception about dyslexia being a visual deficit when dyslexia was a phonological deficit. For example, the teacher trainees believed that dyslexia is due to the reversals of letters and words, but that perception is wrong. This result supports a study by Washburn et al. (2017), who reported that teachers struggled to differentiate between visual deficits and dyslexia; they had simply assumed that dyslexia is word blindness, where a person cannot recognize and understand "words" that they see. In addition, 73% (n = 72) of the teacher trainees in this study demonstrated that they erroneously held a misconception that dyslexia does not usually last for a long time but actually does. This result is consistent with a study by Dodur and Kumaş (2020), where 56% (n = 146) of in-service primary school teachers in Turkey believed that dyslexia does not last a long time, while 44% (n = 114) of the teachers knew that dyslexia is a long-term condition. In Dodur and Kumaş's study, a small percentage of teachers held bachelor's degrees and had learned about dyslexia during their in-service training. However, 27% reported that they knew nothing about the condition.

Moreover, in terms of diagnosis, teacher trainees in the present study misinterpreted how to diagnose dyslexia among the students; the teacher trainees believed that individuals with dyslexia

have below-average intelligence. This kind of generalization is a misconception, however. There is empirical evidence that readers with dyslexia excelled more than readers without dyslexia when navigating visuospatial tasks, with males having an advantage over females (Brunswick et al., 2010). Furthermore, a study by Chamberlain et al. (2018) suggests a significant variance in perception, attention, and memory among individuals with dyslexia. Another misconception on the treatment of dyslexia is that the teacher trainees believed that children with dyslexia could be cured using coloured lenses. Coloured lenses are not the ideal treatment for students with dyslexia, and their effectiveness is still contested (Ramli et al., 2019). It is supported by Henderson et al. (2013) that coloured overlays do not benefit students with and without dyslexia in reading.

Moreover, the benefits of coloured overlays may not become visible after prolonged durations of reading, which may produce fatigue (Sjöblom, Eaton, & Stagg, 2016). Additionally, the number of actual teachers who were specifically trained to teach students with dyslexia is still low. The following question in the current study, Most teachers receive specific training to work with dyslexic children, indicated that a large proportion of teacher trainees' (78.9%, $n = 78$) held a misconception that most teachers are trained to work with children with dyslexia. Still, in reality, few teachers have received specific training to work with children with dyslexia.

Past research has shown that teachers familiar with phonemic awareness can better help their students decode through classroom activities. In the present study, a moderate proportion of teachers (31%, $n = 31$) held misconceptions that children with dyslexia did not have problems in their ability to hear and manipulate sounds in language. Bae et al. (2019) investigated the knowledge of 73 Chinese EFL teachers from seven public schools in four northern Chinese provinces and 39 Korean EFL teachers from four public schools in Seoul. The authors used the Reading Teacher Knowledge Survey to examine the respondents' implicit and explicit knowledge of phonemic awareness. The findings of this study revealed that both Chinese and Korean teachers had implicit rather than an explicit understanding of phonemic awareness and regarded themselves as confident in teaching phonemic awareness. Other studies (e.g., Apandi & Nor, 2019) reported that teacher trainees' preparation to handle students with dyslexia and their identification of suitable teaching strategies significantly circumvent misconceptions and lack of information on dyslexia. Based on Apandi and Nor's study, the teacher professional development process should provide sufficient prior practical, experiential training for teacher trainees to work with students with dyslexia. Teacher trainees should be aware of the signs and symptoms of students with dyslexia. Teacher trainees can also incorporate multisensory learning in the classroom to enhance students' memory and understanding of letter sounds, letter-sound correspondence, and decoding. Since students with dyslexia have difficulties in making connections between spoken and written words and differentiating specific sounds, syllables, and words in sentences, teacher trainees could be introduced to provide reading instruction using the multisensory learning approach by engaging and presenting the lessons through the visual, auditory, and kinesthetic pathways. Furthermore, it is also suggested that teacher trainees focus on structured, sequential, direct instruction in teaching to improve the reading ability of children with dyslexia.

4 CONCLUSION

The present study contributes to a better understanding that all teacher trainees must have adequate knowledge of dyslexia and should continually develop their knowledge during the in-service training. Based on the results above, we can conclude that not all teacher trainees are familiar with dyslexia in terms of the general information, symptoms, diagnosis, and treatments. Teacher trainees need to master every aspect of dyslexia because it will help them to enhance their skills to teach students with dyslexia. Various training programs are required to combat misconceptions about dyslexia among teacher trainees. There is room for improvement in the pre-service training programs for improving teacher trainees' knowledge and skills on the symptoms, diagnosis, and intervention of dyslexia throughout their pre-service teacher training duration.

Limitations

There are several limitations related to this study. The participants in this study were teacher trainees undergoing teacher training program at the Teacher Training Institute of Malaysia (*Institut Pendidikan Guru Malaysia*). They were mostly in the first and second year of their studies. Therefore, it is warranted that future studies investigate what final-year teacher trainees know about dyslexia. Furthermore, the findings are limited to the knowledge and misconceptions of teacher trainees. Future studies should include in-service teachers. Another limitation is relying solely on the Knowledge and Belief about Developmental Dyslexia (KBDDS) to elicit the knowledge and misconceptions regarding dyslexia. A future study is warranted to ascertain the knowledge of dyslexia using proximal measures such as actual scenarios or case studies on how children with dyslexia could be managed in school. Finally, the present study was conducted during the Covid-19 pandemic; the total number of respondents was only 99. Thus, replication with a larger sample size is warranted in future studies to generalize to the wider population.

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APPENDIX A

INSTRUCTIONS AND SAMPLE OF SURVEY

This questionnaire is a part of the study on Knowledge and Belief of Developmental Dyslexia among Primary School Teachers in Malaysia. This study aims to investigate Malaysia Primary school teachers' knowledge and misconceptions in general information, symptoms/diagnosis, and treatment of dyslexia. Your participation is important to the study.

How to fill in this questionnaire:

a) Demographic section

1. Every respondent must provide information on the age, gender, years of teaching, and teaching roles on the empty blanks given.
2. For the self-efficacy measurement, participants must rate (click) on a suitable point between a 1-7 point scale.

b) Knowledge and Beliefs about Developmental Dyslexia Scale (KBBDS)

1. This questionnaire consists of 36 items with on three main topics, namely, general knowledge, symptom/diagnosis, and treatments on dyslexia. Each item consists of a dyslexia statement and uses a format that is true and false.
2. Please answer every question by ticking a True or False box like this.



SURVEY FORM

KNOWLEDGE AND BELIEF ON DEVELOPMENTAL DYSLEXIA AMONG PRIMARY SCHOOL TEACHERS IN MALAYSIA

Assalamualaikum / Salam Sejahtera,

My name is Izzati Suffiah binti Muhammad Amin Faudzi, a final year student of Cognitive Science at Universiti Malaysia Sarawak (UNIMAS). I am currently conducting a research to collect data for my Final Year Project entitled "Knowledge and Belief on Developmental Dyslexia among Primary School Teachers in Malaysia".

The aim of this research is to investigate the general knowledge and misconceptions that Malaysian primary school teachers have about dyslexia.

The survey consists of **FOUR (4) SECTIONS**: Demographic Information, General Knowledge, Symptoms/Diagnosis, and Treatment on Dyslexia. This survey will take 5-10 minutes to answer. This questionnaire is bilingual (English and Malay).

Instruction: You are required to answer ALL questions in each section. Your information will be kept strictly confidential and will be used for research purposes only.

If you have any inquiry, kindly contact me at

Contact No: 019-9911196

Email: eizafaudzi99@gmail.com

Thank you for your time answering the survey.

SECTION A: (DEMOGRAPHIC INFORMATION)

1. Age (<i>Umur</i>): <input type="text"/>						
2. Gender (<i>Jantina</i>):						
Female (<i>Perempuan</i>): <input type="text"/>						
Male (<i>Lelaki</i>) : <input type="text"/>						
3. Years of teaching experience (<i>Pengalaman mengajar</i>):						
<input type="text"/>						
4. Teaching roles (<i>Bidang mengajar</i>):						
<input type="text"/>						
5. Have you ever taught a child who was diagnosed with developmental dyslexia? (<i>Adakah anda pernah mengajar kanak-kanak yang didiagnosis dengan disleksia?</i>):						
Yes (<i>ya</i>) <input type="checkbox"/> No (<i>tidak</i>) <input type="checkbox"/>						
6. On-7 point scale, to which extent you could effectively teach a child with dyslexia? (<i>Dalam skala titik 7, sejauh mana anda dapat mengajar kanak-kanak disleksia dengan berkesan?</i>)						
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	2	3	4	5	6	7
Not effective at all (<i>Tidak berkesan sama sekali</i>)			Effective (<i>Sangat berkesan</i>)			

SECTION B: (GENERAL INFORMATION SCALE)Please tick (/) on your answer. (*Tandakan (/) pada jawapan anda.*)

ITEM Perkara	GENERAL INFORMATION SCALE <i>Skala Maklumat Am</i>	True Betul	False Salah
1.	Dyslexia is a neurologically based disorder. <i>Disleksia adalah gangguan berdasarkan neurologi.</i>		
2.	Dyslexia is caused by visual perception deficits resulting in reversals of letters and word. <i>Disleksia disebabkan oleh defisit persepsi visual yang mengakibatkan pembalikan huruf dan perkataan.</i>		
3.	A child can be dyslexic and gifted. <i>Seorang kanak-kanak boleh mengalami disleksia dan berbakat.</i>		
4.	Most children with dyslexia usually have emotional and/or social problems. <i>Sebilangan besar kanak-kanak dengan disleksia biasanya mempunyai masalah emosi dan / atau sosial.</i>		
5.	The brains of people with dyslexia are different from those of people without dyslexia. <i>Otak penghidap disleksia berbeza dengan orang yang tidak mengalami disleksia.</i>		
6.	Dyslexia is hereditary. <i>Disleksia turun temurun.</i>		
7.	Most studies indicate that about 5% of school-age students have dyslexia. <i>Sebilangan besar kajian menunjukkan bahawa kira-kira 5% pelajar usia sekolah mengalami disleksia.</i>		
8.	Dyslexia is more frequent in males than females. <i>Disleksia lebih kerap berlaku pada lelaki berbanding wanita.</i>		
16.	All poor readers have dyslexia. <i>Semua pembaca yang lemah menghidap disleksia.</i>		
20.	Students who have reading disabilities without an apparent cause (e.g., intellectual disabilities, absenteeism, inadequate instruction...) are referred to as dyslexic. <i>Pelajar yang mempunyai masalah membaca tanpa sebab yang jelas (misalnya, kecacatan intelektual, ketidakhadiran, pengajaran yang tidak mencukupi, ...) disebut sebagai disleksia.</i>		
21.	Children with dyslexia are not stupid or lazy. Being knowledgeable about dyslexia can help them. <i>Kanak-kanak dengan disleksia tidak bodoh atau malas. Berpengetahuan mengenai disleksia dapat menolong mereka.</i>		
25.	I think dyslexia is a myth, a problem that does not really exist. <i>Saya fikir disleksia adalah mitos, masalah yang sebenarnya tidak wujud.</i>		
27.	Problems in establishing laterality (body schema) are the cause of dyslexia.		

	<i>Masalah dalam mewujudkan lateral (skema badan) adalah penyebab disleksia.</i>		
29.	Dyslexia refers to a relatively chronic condition that is usually cannot be completely overcome. <i>Disleksia merujuk kepada keadaan yang agak kronik yang biasanya tidak dapat diatasi sepenuhnya.</i>		
30.	Many students with dyslexia continue to have reading problems as adults. <i>Ramai pelajar yang mengalami disleksia terus mengalami masalah membaca ketika dewasa.</i>		
31.	Many students with dyslexia have low self-esteem. <i>Ramai pelajar dengan disleksia mempunyai keyakinan diri yang rendah.</i>		
35.	Dyslexia usually lasts a long time. <i>Disleksia adalah kekal.</i>		

SECTION C: (SYMPTOMS/DIAGNOSIS SCALE)

Please tick (/) on your answer. (Tandakan (/) pada jawapan anda).

ITEM Perkara	SYMPTOMS/DIAGNOSIS SCALE <i>Skala Gejala dan Diagnosis</i>	True Betul	False Salah
9.	Generally, children with dyslexia have problems with phonological awareness (e.g., the ability to hear and manipulate sounds in language). <i>Umumnya, kanak-kanak dengan disleksia mempunyai masalah dengan kesedaran fonologi (misalnya, kemampuan untuk mendengar dan memanipulasi bunyi dalam bahasa).</i>		
11.	People with dyslexia have below-average intelligence. <i>Orang yang mengalami disleksia mempunyai kecerdasan di bawah purata.</i>		
12.	Students with dyslexia often read with inaccuracy and lack of fluency. <i>Pelajar dengan disleksia sering membaca dengan tidak tepat dan kurang fasih.</i>		
13.	Reversing letters and words is the main characteristic of dyslexia. <i>Membalikkan huruf dan perkataan adalah ciri utama disleksia.</i>		
14.	Difficulty with phonological processing of information is one of the major deficits found in dyslexia. <i>Kesukaran memproses maklumat secara fonologi adalah salah satu kekurangan utama yang terdapat pada disleksia.</i>		
15.	Intelligence tests are useful in identifying dyslexia. <i>Ujian kecerdasan berguna dalam mengenal pasti disleksia.</i>		
32.	Children with dyslexia have problems with decoding and spelling, but not with listening comprehension. <i>Kanak-kanak disleksia mempunyai masalah dengan penyahkodan dan ejaan, tetapi tidak dengan pemahaman mendengar.</i>		
33.	Applying an individual reading test is essential in diagnosing dyslexia. <i>Mengaplikasikan ujian membaca individu adalah mustahak dalam mendiagnosis disleksia.</i>		
34.	Children with dyslexia generally tend to be poor spellers. <i>Kanak-kanak dengan disleksia biasanya cenderung menjadi ejaan yang lemah.</i>		
36.	Dyslexia is characterized by difficulties in learning to read fluently. <i>Disleksia dicirikan oleh kesukaran belajar membaca dengan lancar.</i>		

SECTION D: (TREATMENT SCALE)

Please tick (/) on your answer. (Tandakan (/) pada jawapan anda).

ITEM Perkara	TREATMENT SCALE Skala Rawatan	True Betul	False Salah
10.	Modelling fluent reading is often used as a teaching technique. <i>Pemodelan fasih membaca sering digunakan sebagai teknik pengajaran.</i>		
17.	Children with dyslexia can be helped by using colored lenses/colored overlays. <i>Kanak-kanak dengan disleksia dapat dibantu dengan menggunakan lensa berwarna / lapisan berwarna.</i>		
18.	Physicians can prescribe medications to help students with dyslexia. <i>Doktor boleh menetapkan ubat untuk membantu pelajar dengan disleksia</i>		
19.	Multisensory instruction has been shown to be an ineffective teaching method for treating dyslexia. <i>Arahan multisensori telah terbukti sebagai kaedah pengajaran yang tidak berkesan untuk merawat disleksia.</i>		
22.	Giving students with dyslexia accommodations, such as extra time on tasks, shorter spelling lists, special seating close to the teacher, etc., is unfair to other students. <i>Memberi pelajar dengan masalah disleksia, seperti waktu tambahan untuk tugas, senarai ejaan yang lebih pendek, tempat duduk khas dekat dengan guru, dan lain-lain, adalah tidak adil bagi pelajar lain.</i>		
23.	Intervention programs that emphasize phonological aspects of language with letters as visual support are effective for students with dyslexia. <i>Program intervensi yang menekankan aspek fonologi Bahasa dengan huruf sebagai sokongan visual berkesan untuk pelajar dengan disleksia.</i>		
24.	Most teachers receive specific training to work with dyslexic children. <i>Sebilangan besar guru mendapat latihan khusus untuk bekerja dengan kanak-kanak disleksia.</i>		
26.	Techniques involving repeated reading of material (e.g., words, sentences or texts) help to improve reading fluency. <i>Teknik yang melibatkan pembacaan berulang bahan (contohnya, perkataan, ayat atau teks) membantu meningkatkan kefasihan membaca.</i>		
28.	Students with dyslexia need structured, sequential, direct instruction is basic skills and learning strategies. <i>Pelajar dengan disleksia memerlukan arahan yang tersusun, berurutan, langsung adalah kemahiran asas dan strategi pembelajaran.</i>		

-END OF SURVEY-