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Improved understanding of dyslexia in university students after watching an instructional video series

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ABSTRACT

As the prevalence of dyslexia in educational settings rises, it becomes essential to foster an inclusive higher education environment by understanding this learning difference, enabling university students to better support and interact with affected peers. This study employed a two-phase design to enhance university students' understanding of dyslexia and to foster a supportive classroom environment. In phase one, the Knowledge and Beliefs about Developmental Dyslexia Scale (KBDDS) was administered to assess undergraduate students' general knowledge regarding symptoms, diagnosis, and treatment of dyslexia. Phase two involved an intervention using a series of instructional videos and the film "*Taare Zameen Par*," targeted at students scoring below a knowledge threshold. Post-intervention, students significantly increased their understanding of dyslexia (pretest mean: 20.67, SD = 3.33, post-test mean: 27.67, SD = 1.47). The results underscore the efficacy of multimedia educational tools in dispelling misconceptions about dyslexia, highlighting their value in enhancing awareness about dyslexia in university settings. The results highlight the effectiveness of multimedia tools in enhancing students' understanding of dyslexia.

Keywords: dyslexia, misconceptions, knowledge, instructional video, multimedia learning

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1 INTRODUCTION

Dyslexia is a neurological condition affecting reading, writing, speaking, and listening due to difficulties in processing spoken sounds and associating them with letters and words (Ramli et al., 2019; Shaywitz & Shaywitz, 2020). Categorised as a specific learning disability (SLD), dyslexia presents diverse challenges (Grigorenko et al., 2020) despite an individual's intelligence and access to appropriate educational resources. Its neurological basis (International Dyslexia Association, 2002) leads to difficulties in word recognition, spelling, and reading, often marked by phonological processing challenges. Common symptoms include slow reading, difficulty with sight words, and challenges in spelling and writing. Individuals with dyslexia may also exhibit disorganised handwriting, poor organisational skills, difficulty following oral instructions, reluctance to read aloud, and in some cases, challenges with math skills (Shaywitz & Shaywitz, 2020). These difficulties typically emerge in early childhood and may persist into adulthood if not addressed, underscoring the importance of early detection and intervention for academic success and effective coping strategies (International Dyslexia Association, 2002).

Early detection of dyslexia in school-aged children is crucial due to its prevalence as a learning condition (Soriano-Ferrer et al., 2015). While the International Dyslexia Association (2002) estimates that dyslexia affects 5% to 10% of children, with boys diagnosed more frequently than girls, this percentage varies by age group. In Malaysia, a significantly higher proportion of school-age children, ranging from 26.2% to 33.83%, depending on the type of assessment, exhibit at-risk symptoms of reading difficulties (Lee et al., 2020; Lee et al., 2022). These difficulties, particularly in reading and comprehension, can hinder language development and social interaction.

The prevalence of reading difficulties has increased significantly over the years. The Malaysian Ministry of Education reported an increase in identified cases from 12,419 in 2019 to 13,302 in 2020. The rising number of diagnosed cases suggests a substantial and likely underrepresented global population of dyslexic adults, including in Malaysia. Therefore, early identification and intervention are crucial for effective lifelong support.

Adequate support for individuals with dyslexia requires a thorough understanding from parents, educators, and peers. Early intervention, including appropriate testing and support, is crucial if children display early signs such as difficulties in reading, writing, or spelling (Shaywitz & Shaywitz, 2020). Informed parents can provide better home and classroom support (International Dyslexia Association, 2002), while knowledgeable educators can implement evidence-based teaching practices and targeted interventions to address the diverse learning needs of students with dyslexia (Reid, 2016). Without this understanding, children with dyslexia may face negative experiences, social isolation, and frustration. Collaboration among parents, educators, and peers is essential to provide the resources and support for children with dyslexia to thrive academically and socially.

Research on dyslexia awareness from various sectors reveals significant gaps in understanding among parents, teachers, and students. The most critical factor in supporting dyslexic children is parental knowledge about dyslexia and its effects on their children (Abd Rauf et al., 2018). When unaware of dyslexia, parents may exhibit negative emotions, such as frustration, denial,

and worry, particularly when their children fail to meet their expectations (Abd Rauf et al., 2021; Wilmot et al., 2023). Moreover, these parents often experience low self-esteem and anxiety regarding their children's academic achievement and future. Such stressors not only affect the children but also have a detrimental impact on the parents' lives, leading to stress, lack of sleep, and exhaustion. This highlights the urgent need for accurate education and awareness concerning the impact of dyslexia on children's academic success. Similarly, a study by Ness and Southall (2010) and Washburn et al. (2014) found that both preservice and in-service teachers hold misconceptions about dyslexia, with little known about the specific areas where teachers lack confidence. Both groups also revealed the false belief that a characteristic of dyslexia is seeing letters and words backward. This highlights the necessity of professional development programs to enhance teachers' ability to identify and effectively support students with dyslexia.

Andreassen et al. (2017) revealed that only 30% of university students know accurately about dyslexia, including its characteristics and effects on learning. Many students hold misconceptions, such as the belief that dyslexia affects only IQ or that it is merely a reading issue that can be resolved through sheer effort. These findings underscore the urgent need for improved education and awareness campaigns to foster a proper understanding of dyslexia among undergraduate students and support those affected by the condition.

The current study focused on raising awareness in university settings, where Andreassen et al. (2017) found considerable gaps in students' understanding of dyslexia. By addressing these gaps, this research offers a more comprehensive perspective of dyslexia in higher education. While prior studies, such as those conducted by Peltier et al. (2022), focused primarily on teachers, this study shifts the emphasis to undergraduate students. This distinction highlights an overlooked demographic in academic research that is crucial for promoting inclusive practices regarding dyslexia.

Furthermore, little is understood on the impact of videos on learning topics such as dyslexia. One notable study investigated the impact of videos on learning outcomes within a real-world classroom setting (Tani et al., 2022). The study provided empirical evidence supporting the positive effects of videos on student learning, demonstrating that videos can be a valuable tool for enhancing educational experiences. Tani et al.'s (2022) study shed light on how videos can be effectively integrated into classroom instruction. Conversely, Ploetzner and Schlag's (2013) research examined the cognitive mechanisms underlying learning from animations. Ploetzner and Schlag (2013) reported that the use of animations and the role of memory in information retention are related. Both studies contribute valuable insights into understanding how visual media can enhance learning. Together, these studies suggest that well-designed visual media, whether videos or animations, can positively influence learning outcomes.Considering these research gaps, the present study sought to examine the effectiveness of instructional video series in raising awareness about dyslexia among university students. We addressed four main research questions in this study:

1. How well do university undergraduate students understand dyslexia in terms of general knowledge, symptoms and diagnosis, and treatment?

2. Is there a significant difference in undergraduate students' understanding of dyslexia before and after instructional video intervention?
3. Is there a significant difference in undergraduate students' misconceptions about dyslexia before and after the instructional video intervention?
4. Is there a significant difference in undergraduate students' prior knowledge of symptoms, diagnosis, and treatments of dyslexia before and after the instructional video intervention?

2 METHODS

2.1 Research Design

The study utilised a descriptive research methodology (Creswell & Creswell, 2018) to investigate dyslexia awareness among undergraduate students. Data were collected using the Knowledge and Beliefs about Developmental Dyslexia Scale initially developed by Soriano-Ferrer et al. (2015) and adapted by Suffiah and Lee (2022) for the Malaysian population (see 2.3 Instruments for details). Pretest and post-test data were analysed using the Wilcoxon Signed Rank Test to assess changes in dyslexia awareness among the undergraduate students.

2.2 Participants

Using a purposive sampling approach, the study involved 30 students from Universiti Malaysia Sarawak. Ten participants were randomly recruited from each of the three faculties: the Faculty of Cognitive Sciences and Human Development (FCSHD), the Faculty of Social Sciences and Humanities (FSSH), and the Faculty of Medicine and Health Sciences (FMHS). Six of these 30 students met the inclusion criteria to participate in Phase 2 of the study, which focused on the instructional video intervention.

2.3 Instruments

The Knowledge and Beliefs about the Developmental Dyslexia Scale (KBDDS) was utilised in the study's survey. The KBDDS included measures on the students' general comprehension of the symptoms, diagnosis, and treatment of dyslexia. This version of the KBDDS was adapted from the original scale developed by Soriano-Ferrer, Echegaray-Bengoa, and Joshi (2015) by Suffiah and Lee (2022). Suffiah and Lee (2022) adapted the original KBDDS for the Malaysian population by presenting the scale in bilingual languages, namely English and Malay. The KBDDS instrument can be found in Appendix A and is divided into four sections: Section A, Section B, Section C and Section D.

Part A comprised demographic questions such as age, gender, years of study, and faculty. Participants were also asked whether they had ever heard of dyslexia and to self-evaluate their ability to understand individuals with dyslexia on a 5-point scale.

Part B included questions about students' experiences with dyslexia. It comprised 36 items designed to gauge general knowledge, symptoms, diagnosis, and dyslexia-related treatments. Each item presented a statement regarding dyslexia that required a true-or-false response from

the respondent. The collected data were analysed using the Statistical Package for Social Sciences (SPSS) version 29.

2.4 Procedure

The KBDDS survey was administered online via Google Forms. Informed consent was obtained prior to the study in accordance with ethical guidelines for research involving human subjects, and the students were briefed about the study's significance. The survey took approximately 10–15 minutes to complete.

A pilot study was conducted with five college students from Universiti Sains Islam Malaysia (USIM) to evaluate the survey process and ensure clarity. The students were instructed to read the guidelines provided in the survey before proceeding to the next section (see Appendix A for the survey items).

In Phase 1 of the actual study, participants utilised the KBDDS to respond to questions regarding general knowledge, symptoms, diagnosis, and treatment of dyslexia. Participants who scored less than 24 out of 36 points were chosen to participate in Phase 2 of the study, which involved watching an instructional video series and the film *Taare Zameen Par,* produced by Aamir Khan Productions: Walt Disney Pictures India. The instructional video series comprised four videos that covered knowledge, misconceptions, symptoms, and treatments of dyslexia. Each video is approximately 2 minutes long (instructional videos).

Taare Zameen Par (2007) is a Bollywood drama that tells the story of Ishaan, an eight-year-old boy with dyslexia who struggles academically in school. Misunderstood by his parents and teachers, he is sent to a boarding school, where he becomes increasingly withdrawn. His new art teacher, Ram Shankar Nikumbh, recognises his condition and supports him through creative teaching methods. With patience and encouragement, Ishaan regains his confidence, excels in art, and significantly improves academically. The film highlights the importance of understanding learning disabilities and nurturing a child's unique potential. *Taare Zameen Par* has a runtime of 2 hours and 42 minutes. After viewing the instructional videos and the film, the participants completed the KBDDS survey as a post-test.

3 RESULTS

3.1 Descriptive Statistics

The descriptive data from the study indicate that the mean pretest score was 20.67 (SD = 3.33), demonstrating considerable variability in students' initial understanding of dyslexia. Scores ranged from 14.00 to 24.00, demonstrating a wide disparity in understanding. Following the intervention, the mean score significantly increased to 27.67, with a lower standard deviation (SD = 1.47), suggesting a substantial improvement and more consistent knowledge levels across the participants. The post-test scores ranged from 26.00 to 30.00, highlighting the effectiveness of the instructional videos and the film *Taare Zameen Par* in enhancing students' understanding of dyslexia. The Related-Samples Wilcoxon Signed Rank Test (p = 0.027) suggests that this improvement was statistically significant, demonstrating the positive impact of the intervention.

Table 1 presents the descriptive statistics of 17 general knowledge items for dyslexia. Approximately 72% of the respondents (n = 21) exhibited essential awareness of dyslexia. The statement that garnered the highest correct response was, Children with dyslexia are not stupid or lazy. Being knowledgeable about dyslexia can help them (96.7%, n = 29). This was closely followed by Dyslexia is a neurologically based disorder (93.3%, n = 28) and A child can be dyslexic and gifted (93.3%, n = 28). Conversely, 28% of the respondents (n = 9) exhibited limited general knowledge of dyslexia. Common misconceptions included: Dyslexia is caused by visual perception deficits resulting in reversals of letters and words (83.3%, n = 25), followed by Dyslexia is hereditary (56.7%, n = 17).

Table 1. The general knowledge of undergraduate students about dyslexia.

No.	Items	Knowledgeable	Misconception	Correct Answer
1	Dyslexia is a neurologically based disorder.	28 (93.3%)	2 (6.7%)	True
2	Dyslexia is caused by visual perception deficits resulting in reversals of letters and words.	5 (16.7%)	25 (83.3%)	False
3	A child can be dyslexic and gifted.	28 (93.3%)	2 (6.7%)	True
4	Most children with dyslexia usually have emotional and/or social problems.	25 (83.3%)	5 (16.7%)	True
5	The brains of people with dyslexia differ from those without dyslexia.	23 (76.7%)	7 (23.3%)	True
6	Dyslexia is hereditary.	13 (43.3%)	17 (56.7%)	True
7	Most studies indicate that about 5% of school-age students have dyslexia.	26 (86.7%)	4 (13.3%)	True
8	Dyslexia is more frequent in males than females.	20 (66.7%)	10 (33.3%)	True
16	All poor readers have dyslexia.	21 (70%)	9 (30%)	False
20	Students who have reading disabilities without an apparent cause (e.g., intellectual disabilities, absenteeism, inadequate instruction) are referred to as dyslexic.	19 (63.3%)	11 (36.7%)	True

21	Children with dyslexia are not stupid or lazy. Being knowledgeable about dyslexia can help them.	29 (96.7%)	1 (3.3%)	True
25	I think dyslexia is a myth, a problem that does not exist.	24 (80%)	6 (20%)	False
27	Problems in establishing laterality (body schema) are the cause of dyslexia.	14 (46.7%)	16 (53.3%)	False
29	Dyslexia refers to a relatively chronic condition that usually cannot be completely overcome.	18 (60%)	12 (40%)	True
30	Many students with dyslexia continue to have reading problems as adults.	23 (76.7%)	7 (23.3%)	True
31	Many students with dyslexia have low self-esteem.	24 (80%)	6 (20%)	True
35	Dyslexia usually lasts a long time.	24 (80%)	6 (20%)	True
	Total average percentage	21 (72%)	9 (28%)	

Note. The numbering of items in Table 1 is based on the questionnaire.

Table 2 lists 10 dyslexia symptoms along with their diagnoses. Approximately 87% of the respondents (n = 26) recognised the signs and diagnoses of dyslexia. The statements with the highest correct responses were Students with dyslexia often read with inaccuracy and lack of fluency (96.7%, n = 29), Children with dyslexia have decoding and spelling problems, but not listening comprehension (96.7%, n = 29), and Applying an individual reading test is essential in diagnosing dyslexia (96.7%, n = 29). Conversely, common misconceptions included beliefs that Reversing letters and words is the main characteristic of dyslexia (86.7%, n = 26), and People with dyslexia have below-average intelligence (56.7%, n = 17).

Table 3 details the undergraduate students' knowledge of treatments for dyslexia. About 66% of respondents (n = 20) understood the treatment options available for dyslexia. The most often commonly selected accurate responses to three key questions were: Students with dyslexia need structured, sequential, direct instruction in basic skills and learning strategies (100%, n = 30), Techniques involving repeated reading of material (e.g., words, sentences, or texts) help to improve reading fluency (96.7%, n = 29), and Intervention programs that emphasise phonological aspects of language with letters as visual support are effective for students with dyslexia (93.3%, n = 28). Common misconceptions included: Most teachers receive specific training to work with dyslexic children (80%, n = 24) and Multisensory instruction is an ineffective teaching method for treating dyslexia (63.3%, n = 19).

Table 2. The understanding of the symptoms and diagnosis of dyslexia among undergraduate students.

No.	Items	Knowledgeable	Misconception	Correct Answer
9	Generally, children with dyslexia have problems with phonological awareness (e.g., the ability to hear and manipulate sounds in language).	27 (90%)	3 (10%)	True
11	People with dyslexia have below-average intelligence.	13 (43.3%)	17 (56.7%)	False
12	Students with dyslexia often read with inaccuracy and lack offluency.	29 (96.7%)	1 (3.3%)	True
13	Reversing letters and words is the main characteristic of dyslexia.	4 (13.3%)	26 (86.7%)	False
14	Difficulty with phonological processing of information is one of the major deficits found in dyslexia.	28(93.3%)	2 (6.7%)	True
15	Intelligence tests are useful in identifying dyslexia.	25 (83.3%)	5 (16.7%)	True
32	Children with dyslexia have decoding and spelling problems but not listening comprehension.	29 (96.7%)	1 (3.3%)	True
33	Applying an individual reading test is essential in diagnosing dyslexia.	29 (96.7%)	1 (3.3%)	True
34	Children with dyslexia generally tend to be poor spellers.	28 (93.3%)	2 (6.7%)	True
36	Dyslexia is characterised by difficulties in learning to read fluently.	27 (90%)	3 (10%)	True
	Total average percentage	26 (87%)	4 (13%)	

Note. The numbering of items in Table 2 is based on the questionnaire.

Table 3. The understanding of the treatment of dyslexia among the undergraduate students.

No.	Items	Knowledgeable	Misconception	Correct Answer
10	Modeling fluent reading is often used as a teaching technique.	28 (93.3%)	2 (6.7%)	True
17	Children with dyslexia can be helped by using coloured lenses/coloured overlays.	15 (50%)	15 (50%)	False
18	Physicians can prescribe medications to help students with dyslexia.	12 (40%)	18 (60%)	False
19	Multisensory instruction is an ineffective teaching method for treating dyslexia.	11 (36.7%)	19 (63.3%)	False
22	Giving students with dyslexia accommodation, such as extra time on tasks, shorter spelling lists, and special seating close to the teacher, etc., is unfair to other students.	19 (63.3%)	11 (36.7%)	False
23	Intervention programmes that emphasise phonological aspects of language with letters as visual support are effective for students with dyslexia.	28 (93.3%)	2 (6.7%)	True
24	Most teachers receive specific training to work with dyslexic children.	6 (20%)	24 (80%)	False
26	Techniques involving repeated reading of material (e.g., words,sentences, or texts) help to improve reading fluency.	29 (96.7%)	1 (3.3%)	True
28	Students with dyslexia need structured, sequential, direct instruction in basic skills and learning strategies.	30 (100%)	0 (0%)	True
	Total average percentage	20 (66%)	10 (34%)	

Note. The numbering of items in Table 3 is based on the questionnaire.

Table 4 presents the pretest results for the 30 participants in Phase 1 of the study. Only those scoring less than 24 out of 36 points (n = 6) were selected to continue to Phase 2. In this intervention phase, the six participants engaged in an instructional video series and the dyslexia-related film named *Taare Zameen Par*. Following the intervention, these participants completed the same KBDDS questionnaire they had answered during the pretest. It is notable that participants from the Faculty of Medicine and Health Sciences (FMHS) consistently achieved higher pretest scores. This could be attributed to the faculty's emphasis on health-related education, which may include greater exposure to learning disabilities such as dyslexia.

Table 4. Pretest results.

Participant Number	Faculty of Medicine and Health Sciences	Faculty of Social Science and Humanities	Faculty of Cognitive Sciences and Human Development
1	33	31	34
2	31	28	30
3	28	27	29
4	28	27	28
5	28	27	27
6	27	26	25
7	27	25	25
8	27	21	22
9	27	22	22
10	26	14	23

Table 5 presents the pretest and post-test results for the six students who participated in the intervention phase. Most participants (n = 6) scored 22 on the pretest, with four obtaining this score, indicating a moderate understanding. The scores ranged from a minimum of 14 to a maximum of 23, suggesting a concentration around 22 and highlighting the significant differences between the lowest and highest scores.

Following the intervention, the post-test scores indicated that three participants scored 26 (maintaining a moderate level), while one student scored 27 and two scored 29. The post-intervention scores were more tightly clustered around the mean compared to the pretest intervention scores. Specifically, the mean score increased from 20.67 on the pretest to 27.17 on the post-test. Furthermore, there was a decrease in standard deviation from before to after the intervention (i.e., from SD = 3.33 to SD = 1.47). These results demonstrate that the intervention helped increase test scores while reducing variability in participants' knowledge of dyslexia.

Table 5. Pretest and post-test results of participants in the intervention phase.

	Faculty of Social Science and Humanities			Faculty of Cognitive Sciences and Human Development	
	Before	After		Before	After
Participant 1	21	26	Participant 1	22	26
Participant 2	22	26	Participant 2	22	27
Participant 3	14	29	Participant 3	23	30

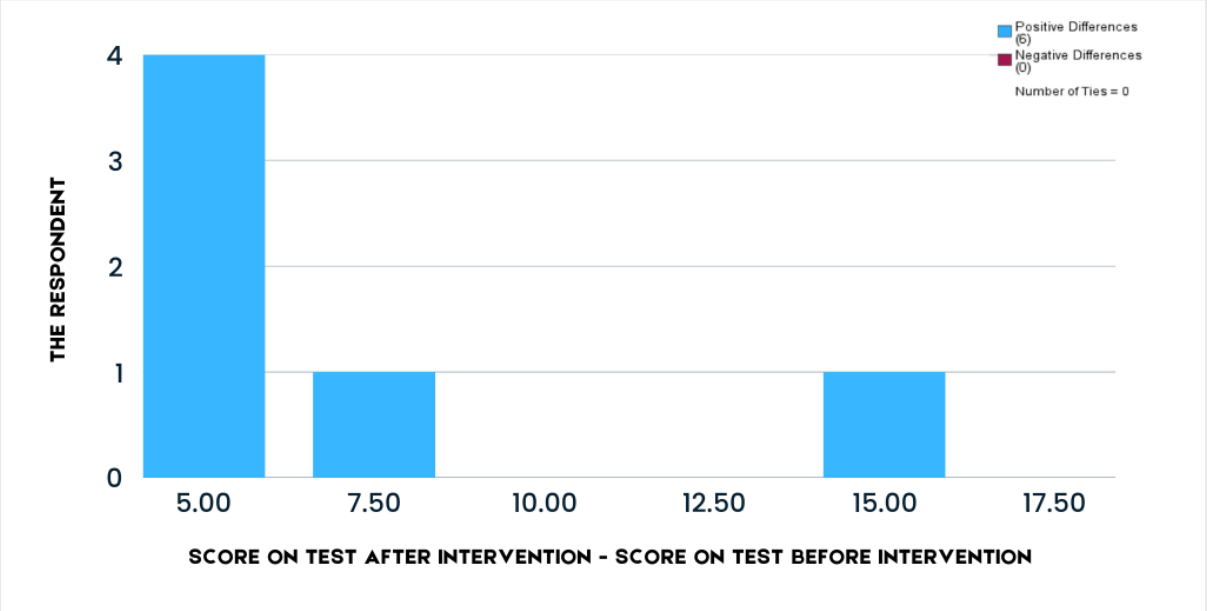

Figure 1. Scores before intervention – scores after intervention.

The bar chart (see Figure 1) illustrates the results of a Related-Samples Wilcoxon Signed Rank Test, which shows the differences in test scores before and after an intervention. Four individuals increased their scores by 5 points, one by 7.5 points, and one by 15 points. This suggests that all individuals' scores improved after the intervention, with no negative differences or ties identified. These results indicate that the intervention positively impacted test performance, with gain scores ranging from 5 to 15 points.

The data analysis revealed that undergraduate students have varying levels of knowledge about dyslexia, with approximately 72% demonstrating critical awareness of the topic. Notably, a significant majority correctly identified that dyslexia is a neurological condition (93.3%), that children with dyslexia are neither lazy nor unintelligent (96.7%), and a child can be both dyslexic and intelligent (93.3%). However, misconceptions persist, particularly regarding the causes of dyslexia and its hereditary nature. A substantial proportion of participants (83.3%) erroneously believed that visual issues, such as mixing up letters or words, are responsible for dyslexia, while 56.7% were unaware of its genetic connection. These findings underscore the

necessity for enhanced education about the causes and symptoms of dyslexia to dispel common myths and improve overall understanding.

The analysis also revealed that 87% of undergraduates accurately identified the signs and diagnostic criteria of dyslexia, indicating a solid understanding of the topic. Key facts recognised by the participants include that individuals with dyslexia often read slowly and inaccurately (96.7%), struggle with decoding and spelling but typically have good listening comprehension (96.7%) and require individualised reading assessments for diagnosis (96.7%). However, misconceptions remain widespread, many still believe that reversing letters and words is the primary characteristic of dyslexia (86.7%) and incorrectly associate dyslexia with below-average intelligence (56.7%). These misconceptions underscore the need for greater awareness of dyslexia's complex diagnostic features to foster better support for those affected by it.

Additionally, the analysis indicated that undergraduate students possess a moderate understanding of dyslexia treatment options, with 66% correctly recognising effective approaches. The most widely accepted concepts include the importance of structured, sequential, and direct instruction in fundamental skills and learning strategies (100%), the effectiveness of repeated reading techniques for enhancing reading fluency (96.7%), and the benefits of phonological-based intervention programmes that incorporate visual letter support (93.3%). However, several misconceptions persist, a high proportion of participants (80%) mistakenly believed that most teachers have specialised training to support children with dyslexia, while 63.3% perceived multimodal instruction as ineffective. These findings highlight the importance of providing more information on evidence-based dyslexia therapies to dispel myths and enhance support for students with dyslexia.

In summary, the study's findings indicate that undergraduate students exhibit varying levels of understanding of dyslexia, including its general characteristics, symptoms, diagnosis, and treatment options. While 72% of participants demonstrated basic dyslexia awareness, common misconceptions remain, particularly regarding its causes. Many attributed dyslexia to visual perception impairments or questioned its genetic nature. Knowledge of symptoms and diagnosis was notably stronger, with 87% correctly identifying key characteristics, such as difficulties with fluency and decoding. However, misconceptions linking dyslexia with low IQ and letter reversals persist. Regarding treatment options, 66% of participants identified effective strategies, such as structured instruction and phonological-based interventions, yet many held inaccurate ideas about teacher training and the effectiveness of multimodal approaches. These findings underscore the need for comprehensive education to dispel myths and enhance dyslexia awareness across all areas.

4 DISCUSSION

The present study, which comprised two phases, examined undergraduate students' knowledge and misconceptions about the general information, symptoms, diagnosis, and treatment of dyslexia in the first phase. This was followed by a second phase where an intervention comprising a series of instructional videos and the film "*Taare Zameen Par*" was conducted for students who scored below a knowledge threshold. Meanwhile, the comparatively higher pretest scores observed among FMHS participants may be due to the faculty's emphasis on medical and health-related topics, which likely include developmental and learning disorders.

This suggests that students from certain faculties directly exposed to relevant subject matter may already have a higher baseline understanding of dyslexia.

The findings of this study indicate that university students have varying levels of knowledge regarding dyslexia, with a significant portion holding misconceptions about its causes, symptoms, and treatments. University students' initial understanding of dyslexia was weaker before the intervention, only 72% of students demonstrated basic awareness of dyslexia. Many participants correctly identified that dyslexia is a neurological disorder and that individuals with dyslexia are neither lazy nor unintelligent. However, common misconceptions persisted, such as the belief that dyslexia is primarily characterised by letter reversals (86.7%) and not hereditary (56.7%). These misconceptions indicate a gap in foundational knowledge that requires targeted educational efforts.

The intervention's impact on students' general understanding of dyslexia is noteworthy. The study revealed a significant improvement in students' understanding post-intervention, with the mean score increasing from 20.67 (SD = 3.33) to 27.67 (SD = 1.47). The Related-Samples Wilcoxon Signed Rank Test ($p = 0.027$) yielded statistically significant results, thus demonstrating that the use of multimedia interventions effectively reinforced key concepts and dispelled common myths, supporting previous research that suggests video-based learning enhances comprehension of complex topics.

There were stark changes in misconceptions about dyslexia after the intervention. Before the intervention, many participants believed visual perception deficits primarily caused dyslexia and associated it with lower intelligence. However, misconceptions about dyslexia saw a notable reduction post-intervention. For example, before the intervention, 83.3% of students incorrectly believed visual perception issues caused dyslexia. Following the intervention, this misconception was largely corrected, with most students recognising dyslexia's phonological processing deficits as the primary characteristic. Additionally, the belief that individuals with dyslexia have below-average intelligence dropped significantly, demonstrating a shift toward a more accurate understanding of the condition.

Students' understanding of dyslexia symptoms, diagnosis, and treatment also improved post-intervention. Before the intervention, 87% of participants demonstrated understanding of dyslexia symptoms and diagnosis. However, misconceptions persisted, such as the belief that reversing letters and words is the main characteristic of dyslexia. Post-intervention, students had improved accuracy in identifying symptoms, with an increased awareness of phonological processing deficits as a primary issue. Similarly, the students' understanding of effective treatment methods improved, particularly regarding structured, sequential, and multisensory instructional strategies.

The current study highlights the effectiveness of multimedia educational tools, specifically instructional videos and films, in improving dyslexia awareness. This aligns with findings from other research, such as Tani et al. (2022), who demonstrated the positive impact of videos on learning outcomes in an actual learning environment. Ploetzner and Schlag (2013) also support this, highlighting the effectiveness of dynamic visualisations (animated and narrated materials) in instruction. The combination of videos and the film appear effective, leading to improved knowledge and more consistent dyslexia awareness among participants.

This study illuminates the importance of multimedia tools in educating university students about learning disabilities. The instructional videos and film showed promise in fostering a deeper understanding, suggesting that similar approaches could be applied to other educational topics that require correcting misconceptions.

There are important limitations that should be addressed in future research. The sample in the present study was limited to students from Universiti Malaysia Sarawak, which may restrict the generalisability of the findings. Future studies should include a larger and more diverse sample to validate the effectiveness of multimedia interventions across different academic and cultural settings. Additionally, while the KBDDS provided valuable insights into students' knowledge and beliefs, future research should incorporate qualitative methods, such as interviews or focus groups, to better understand students' perspectives on dyslexia.

Another limitation is the narrow inclusion of students from only three faculties. Given that professionals in certain fields such as education, psychology, counselling, social work, and healthcare play a critical role in supporting individuals with dyslexia, future studies should be more expansive in the inclusion of university students from various fields of study. Future studies could also expand the sample to include students from all university faculties and compare knowledge levels across different programmes, as well as between undergraduate and postgraduate students, to assess the broader impact of dyslexia awareness initiatives.

Finally, further studies should investigate the long-term retention of dyslexia knowledge post-intervention to determine whether multimedia learning has a lasting impact or if periodic reinforcement is necessary. Evaluating whether these interventions influence students' behaviour in real-world settings, such as their interactions with peers with dyslexia, would also provide valuable insights into the practical implications of enhanced awareness.

5 CONCLUSION

This study was conducted in Malaysia, contributing valuable regional data to complement global findings, such as those by Grigorenko et al. (2020). It demonstrates the worldwide significance of dyslexia awareness.

This study demonstrates that targeted educational interventions, particularly multimedia-based approaches, can significantly improve university students' understanding of dyslexia. Specifically, after engaging with the instructional video series and the film *Taare Zameen Par*, students notably increased their understanding of dyslexia as a neurological condition. This improvement underscores the effectiveness of multimedia-based interventions in correcting misconceptions and enhancing awareness.

Addressing misconceptions and increasing awareness is essential in fostering a more inclusive and supportive academic environment. Universities should consider incorporating dyslexia education into their curricula, ensuring that all students especially those entering education, psychology, and healthcare fields develop the knowledge necessary to support individuals with dyslexia effectively. By continuing to explore innovative educational methods, institutions can promote greater inclusivity and equip students with the awareness and skills needed to contribute to a more informed and supportive society.

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AUTHOR CONTRIBUTIONS

The first author conceived and designed the study, conducted the intervention, and contributed to writing the manuscript. The second author guided the research design, supervised the data analysis, and critically reviewed and revised the manuscript. Both authors contributed to interpreting the results and writing the manuscript and approved the final version.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this study.

DATA AVAILABILITY STATEMENT

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

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Appendix A: Questionnaires

Section A: Demographic Information

SECTION A: (DEMOGRAPHIC INFORMATION)

1. Age (Umur): ☐

2. Gender (Jantina):

   Female (Perempuan): ☐

   Male (Lelaki): ☐

3. Years of study (Tahun Pengajian): ☐

4. Phone Number (Nombor Telefon): ☐

5. Faculty (Fakulti): ☐

6. Have you ever heard about dyslexia? (Adakah anda pernah mendengar tentang disleksia?):

   Yes (ya) ☐ No (tidak) ☐

7. On-5 point scale, to which extent you could effectively understand a child with dyslexia?

   (Dalam skala titik 5, sejauh mana anda dapat memahami kanak-kanak disleksia dengan berkesan?):

☐	☐	☐	☐	☐
1	2	3	4	5

Not effective at all (Tidak berkesan sama sekali) — **Effective (Berkesan)**

Section B: General Information Scale

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

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

Section C: Symptoms/ Diagnosis Scale

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

Section D: Treatment Scale

ITEM *Perkara*	**TREATMENT SCALE** *Skala Rawatan*	**TRUE** *Betul*	**FALSE** *Salah*
10.	Modelling fluent reading is often used as a teaching technique. *Memodelkan bacaan lancar sering digunakan sebagai teknik pengajaran.*		
17.	Children with dyslexia can be helped by using colouredlenses/coloured overlays. *Kanak-kanak dengan disleksia dapat dibantu dengan menggunakan lensa berwarna / lapisan berwarna.*		
18.	Physicians can prescribe medications to help students with dyslexia. *Doktor boleh menetapkan ubat untuk membantu pelajar dengan disleksia*		
19.	Multisensory instruction is an ineffectiveteaching method for treating dyslexia. *Arahan multisensori telah terbukti sebagai kaedah pengajaran yang tidak berkesan untuk merawat disleksia.*		
22.	Giving students with dyslexia accommodation, such as extra time on tasks, shorter spelling lists, special seating close to the teacher, etc., is unfair to other students. *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.*		
23.	Intervention programmes that emphasise phonological aspects of language with letters as visual support are effective for studentswith dyslexia. *Program intervensi yang menekankan aspek fonologi Bahasa dengan huruf sebagai sokongan visual berkesan untuk pelajar dengan disleksia.*		
24.	Most teachers receive specific training to work with dyslexic children. *Sebilangan besar guru mendapat latihan khusus untuk bekerja dengan kanak-kanak disleksia.*		
26.	Techniques involving repeated reading of material (e.g., words, sentences, or texts) help to improve reading fluency. *Teknik yang melibatkan pembacaan berulang bahan (contohnya,perkataan, ayat atau teks) membantu meningkatkan kefasihan membaca.*		
28.	Students with dyslexia need structured, sequential, direct instruction as basic skills and learning strategies. *Pelajar dengan disleksia memerlukan arahan yang tersusun, berurutan, langsung adalah kemahiran asas dan strategi pembelajaran.*		

-END OF SURVEY-