

ORIGINAL ARTICLE

Development of Dyslexia Health Education Module (DHEM) for Preschool Teachers

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ABSTRACT

Introduction: Dyslexia, which is a learning disability that affects many aspects of children's development, has a prevalence of 5 – 17%, worldwide. There are many negative perceptions towards children with dyslexia, and one of it is when there is lack of teachers' knowledge about this problem. **Aim:** The objective of this study is to develop and discuss on a newly developed module on dyslexia, i.e. Dyslexia Health Education Module (DHEM) for preschool teachers, **Method:** This module is developed using the ADDIE model (A-Analysis, D-Design, D-Develop, I- Implement, E-Evaluate). The content of DHEM consists of general information for pre-school teachers about dyslexia, identification and intervention for dyslexia among children as well as its mental health implications. **Results:** The newly developed module was found to have a good content validity with a score of 0.7 when evaluated by eight expert panels from respective fields. The Cronbach alpha's value for reliability test was 0.90. These findings suggest that this module is good, reliable and applicable. **Discussion:** It is hoped that with the development of DHEM, this would increase teachers' knowledge on dyslexia among children in Malaysia, especially in recognizing at-risk children and consequently may lead to early intervention in managing the problem. This study also suggests that future longitudinal studies should be carried out using this module to ensure its effectiveness in the long run.

Keywords: Dyslexia, Health education module, Preschool teacher, Development .

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INTRODUCTION

Dyslexia affects basic skills such as reading, writing, speaking and listening. The main characteristics of individuals with dyslexia are their specific and persistent reading problems (1). Prevalence rates of dyslexia vary, depending on how dyslexia is defined.

Dyslexia is one of the commonest learning disabilities, with prevalence ranging from 5 to 17.5% among school age children (2). In Malaysia, there are approximately 314 000 students who suffer from dyslexia (3). This statistic strengthens the findings from other studies which reported that there were many students who have learning disability (read, write and calculate) and many were being placed in rehabilitation classes in primary

schools (4).

In Malaysia, 5 - 10% of Malaysian primary school students have dyslexia (5). The prevalence of children with dyslexia across the globe is between 5 – 17% (6,7). These numbers show that dyslexia among school students is increasing over time.

Dyslexia is known as a learning difficulty that usually occurs among school children. The academic dropout and behavioural problems among children with dyslexia are the consequence of late diagnosis when addressing this problem. Children with dyslexia are associated with behavioural problems, anti-social, hyperactivity and attention problems (8). The symptoms faced by children with dyslexia will give equivalent impact to their psychosocial development as well. If the behavioural problems are not addressed, it will affect their emotional and social behavioural development which will eventually lead to school failure and low self-esteem (9).

Generally, apart from parents, teachers are the individuals who are responsible and are more concern towards children with dyslexia. However, knowledge about children with dyslexia as early as during the pre-school level, must be acquired in order for teachers to be able to recognize these at-risk children. Negative perceptions including labelling the children with dyslexia, are among the effects of teacher's inadequate knowledge on dyslexia. Ness and Southall (10) reported that the main factor on why teachers have negative perception on students, was due to the lack of knowledge on dyslexia especially in terms of recognizing the characteristics of this disorder. Teachers also had the perception that students with dyslexia were lazy and had mental health problems (11).

Therefore, training and designing a specific program for dyslexia is essential in assisting teachers to understand the issues on dyslexia. The knowledge gained will help teachers identify children who are at-risk, and consequently appropriate intervention for these children will be able to be introduced at an early period. A research conducted by Kantor (12) indicated that mere general information on dyslexia and experience are not adequate, as teachers need more specific knowledge and training on dyslexia to help them identify students with these problems. Based on the needs of the preschool teachers, the objective of this research is to develop a module i.e. Dyslexia Health Education Module (DHEM). It is hoped that DHEM can be an innovation to accommodate the need to increase the knowledge of preschool teachers regarding dyslexia.

MATERIALS AND METHODS

The development of this module is based on ADDIE Model which is a model designed for teaching, that is simple and easy. This model is usually used as a guidance when developing new manual. The ADDIE systematic instructional design model is the generic process used by instructional designers and training developers to create learning content and experiences. The acronym ADDIE stands for five phases which are, "A-Analysis, D-Design, D-Develop, I- Implement, E-Evaluate" (13). Every phase encompasses the fractions of steps that explains on different focuses depending on the contexts that are being applied (14,15).

The analysis phase is an important process to determine the specific needs, required by the target population during the development of the module. The content of the module were based on the findings during this phase. In this study, the analysis was done, based on two sources which were extensive literature review on the subject of dyslexia, as well as two cross-sectional studies. The outputs from this phase were used to plan a strategy for developing the module which consist of learning objectives, content, subject matter, exercise, lesson planning, instruments used for assessment and

appropriate media selection. Meanwhile the design phase is a segment that frames, determines and maneuvers the content that will be incorporated into the module. Consequently, the development phase involves the construction of the learning materials which has been identified in the design phase. The contents of the module consist of general knowledge about dyslexia, identification and intervention for dyslexia, as well as its mental health implications.

This module was finally evaluated by eight expert panels based on their respective disciplines. The fourth phase, which is the implementation phase is when the module is applied and tested among the target population. The study began with piloting the Dyslexia Health Education Module (DHEM) at preschool Federal Territory Islamic Religious Council, Kuala Lumpur and twelve preschool teachers were involved. Subsequently, the actual intervention was conducted at Department of Community Development (KEMAS) preschool in Hulu Langat in which 46 preschool teachers participated as the intervention group. This intervention was conducted for 5 weeks and the total duration was 10 hours. Finally, the evaluation phase involved the evaluation of the effectiveness of the module by a panel of experts. The main objective of this evaluation phase was to objectively measure the content validity of this module. The module was evaluated by eight panel of experts which were Clinical Psychologist, Pediatric Specialist (Child Development), Module Development Expert, Community Health Specialist, Family Medicine Specialist, Child Psychiatric Specialist, an expert in Educational Psychology and a special education teacher. The evaluation phase is considered to be very important as it evaluated each step that took place in the module development. It also ensures that the objective and goal using this instructional design and materials were achieved to meet the teacher's needs.

RESULTS

Analysis

There were two types of needs analysis that has been conducted in this research which were literature review and quantitative data survey. A review of past literatures on articles that discussed on the prevalence of dyslexia and its impact towards mental health among children was also carried out using PubMed, Medline, Ovid, EBSCOHOST and Emerald. In summary, it was found that dyslexia is a specific learning difficulty, and the prevalence was between 5 to 17.5% among school children (16,17,6,7). In Asia, India reported a high prevalence of dyslexia i.e. 13.67% (18) while Malaysia reported a prevalence of 5-10% (19,5). Good mental health is vital for preschool children's growth and development. Children with dyslexia may have mental health problems that can lead to negative behaviour, poor academic performance, social problems and low quality of life, especially when they reach the stage of

adolescence (20). Study reported that anxiety, depression and suicidal thoughts among children with dyslexia, may act as risk factors that can be associated with mental health problems across time (21). As a summary, this module is anticipated to focus on increasing the knowledge for teachers especially in recognizing dyslexia and understanding its impact especially on children's mental health.

There were two quantitative research that were conducted in this study, among preschool children and teachers. A study was conducted using Dyslexia Screening Test- Junior (DSTJ) (22) in order to determine the prevalence of pre-schoolers with symptoms of at-risk dyslexia. It was conducted among 117 KEMAS pre-schoolers and the instrument assessed writing, reading and speaking. The result of this survey found that the prevalence of at-risk dyslexia for KEMAS pre-schoolers was 9%.

Subsequently, a cross-sectional survey was conducted among pre-school teachers in KEMAS Hulu Langat District, Selangor, to assess teacher's knowledge regarding dyslexia. A total of 138 KEMAS pre-school teachers participated in this study. Data was collected using Knowledge and Belief about Developmental Dyslexia Scale questionnaire (23). The main objective of this instrument was to measure the level of knowledge about dyslexia among pre-school teachers. This instrument has three constructs which are, general information, diagnosis and symptoms, as well as intervention and treatment for dyslexia. The findings revealed that 53% of the respondents had misconception and inadequate information on general knowledge about dyslexia.

For diagnosis/symptoms and treatment/intervention of dyslexia, the misconception and inadequate information was 59% and 61% respectively (Table I).

Table I : The teacher's knowledge regarding dyslexia

Construct	Knowledgeable	Misconception	Lack of information
General knowledge on dyslexia	47%	38%	15%
Knowledge on diagnosis/symptoms of dyslexia	41%	28%	31%
Knowledge on treatment of dyslexia	39%	23%	38%

Design

Based on the findings in the analysis phase, five components were decided to be included in the module. The component were general knowledge about dyslexia, identification as well as assessment for dyslexia, impact of this disorder and finally intervention for dyslexia and all these components were further elaborated in detail as shown in Table II:

Development

This module consists of five units altogether. In this

Table II : Content of Dyslexia Health Education Module

UNIT	CONTENT
UNIT 1 Dyslexia: Issues and challenges for teachers	<ul style="list-style-type: none"> • Language development among children • Facts and myths of dyslexia • Issues and challenges for teachers about dyslexia
UNIT 2 Understanding dyslexia	<ul style="list-style-type: none"> • Dyslexia • History • Definition • Contributing factors • Neurological growth • Characteristics of students with high-risk dyslexia
UNIT 3 Dyslexia and mental health	<ul style="list-style-type: none"> • Children with mental health: • Definition and concept • The influence of mental health towards emotional and behavioral development • Implication of mental health towards children with dyslexia.
UNIT 4 Identification and assessment for Dyslexia children	<ul style="list-style-type: none"> • Assessment and validation for children with high risk dyslexia flow chart • Roles of personals • Dyslexia assessment instrument
UNIT 5 Intervention and support for Dyslexia children	<ul style="list-style-type: none"> • Early intervention program • Interdiscipline collaboration

Table III : Example of unit 2 lesson plan

Unit	2
Title	Understanding Dyslexia
Time	120 minutes
Objectives	At the end of this session, participants will be able to: <ol style="list-style-type: none"> 1. Explain the definition and factors of dyslexia. 2. List out 4 characters of children with dyslexia correctly. 3. Complete the functions of left and right brain
Delivery approach	Group works (Interactive learning) Video show Interactive talk
Steps	<ol style="list-style-type: none"> 1. Activity 1 : "Forgive me Arif, mummy..." (video) 2. Activity 2 : Out of sight, out of mind 3. Activity 3 : Interactive lecture: Dyslexia 4. Assessment / Reflection

phase, a more detail description was elaborated on the teaching and learning methods, as well as on how the topics were being delivered such as group discussion, video show, interactive activities in groups, lectures and experience sharing among the teachers. In addition, lectures by experts such as Educational Psychologist, Family Medicine Specialist specializing in learning difficulties, Child Psychiatrist, Clinical Psychologists and Teachers who are experts in which has interactive teaching children with dyslexia, were also incorporated in this module. Every unit has an interactive way of teaching. Evaluation for each unit was conducted at the end of every session, to determine whether the objectives of the sessions had been achieved. To ensure

Table IV : Result of Univariate for dependent variables (test of between – subjects effects).

Independent variable	Dependent variable	Type III Sum of Squares	D.F.	Mean Square	F Value	Sig.	η^2
DHEM	Definition	42.398	1	42.398	12.990	.001	.130
	Characteristic	1834.136	1	1834.136	108.739	.000	.556
	Treatment	785.461	1	785.461	112.364	.000	.564
	School Environment	283.696	1	283.696	25.036	.000	.223
	Impact of disability	376.293	1	376.293	42.704	.000	.329

a. R Squared = .130 (Adjusted R Squared = .120)

b. R Squared = .556 (Adjusted R Squared = .550)

c. R Squared = .564 (Adjusted R Squared = .559)

d. R Squared = .223 (Adjusted R Squared = .215)

e. R Squared = .329 (Adjusted R Squared = .322)

Table V : Result of content validity of module ($\eta=8$)

Num.	Value of content validity of module	Percent	Expert review
1.	Clear objectives of module	78%	Accept
2.	Comprehensiveness of the module on dyslexia	74%	Accept
3.	Suitability of module in term of teaching method	74%	Accept
4.	The content of module has met the target of the population.	80%	Accept
5.	The content of the module is feasible	80%	Accept
6.	Language use is clear and easy to understand	78%	Accept
7.	The content of the module is suitable with the allocated time.	80%	Accept
8.	The module content can enhance the level of knowledge about dyslexia among preschool teachers.	84%	Accept
9.	The manual of the module is sufficient for teachers / individuals.	78%	Accept
10.	Module activities are sufficient for teachers to accomplish the objectives set.	76%	Accept
	Total	78%	Accept

the teaching process was effective, every unit has its own teaching plan that consists of different activities, objectives, duration and delivery approaches. Table III below is the example of the overall unit lesson plan for Unit 2 with the theme, “Understanding dyslexia”.

The complete module design was then evaluated for content validity by eight experts including Clinical Psychologist, Pediatric Specialist (Child Development), Module Development Expert, Community Health Specialist, Family Medicine Specialist, Child Psychiatric Specialist, Educational Psychology expert and special education teacher.

Implementation

In this phase, the execution of the module began with piloting the DHEM, before the actual implementation was carried out. Pilot study was carried out at Majlis Agama Islam Wilayah Persekutuan Preschool (MAIWP) which was attended by 12 respondents. For pilot study, previous studies had suggested that 10-13 respondents were sufficient (24,25). This pilot study was carried out to assess the respondent’s understanding on the newly developed module with regard to language proficiency, suitable activities with objectives, as well as relevant time allocation. The feedback for improvement of the module took place immediately after the pilot study. In addition, the feedback and comments from all experts were also considered during the module improvement process.

Finally, we conducted the actual implementation of

intervention at KEMAS pre-schools in Hulu Langat Districts. Forty-three preschool teachers were chosen randomly to participate in this intervention programme. According to previous study, 15 to 30 respondents are needed for experimental research (26). Respondents were assessed using “Dyslexia Belief Index” before and after the intervention, to evaluate the effectiveness of this module. The results showed, that there was significant difference between intervention and control group in all dependent variables (Table IV) which were as follows: score of definition, [F = 12.990, p < 0.01, $\eta^2 = 0.130$]; score of characteristic [F = 108.739, p < 0.01, $\eta^2 = 0.556$]; score of treatment [F= 112.364, p < 0.01, $\eta^2 = 0.564$]; score of school environment [F = 25.036, p < 0.01, $\eta^2 = 0.223$] and score of impact of disability [F= 376.293, p < 0.01, $\eta^2 = 0.329$] among preschool teachers.

Evaluation

Eventually the final module was evaluated by eight experts who were appointed based on their expertise in their respective fields. The overall score were more than 70%. Table V depicts the overall score given by the appointed experts. The Cronbach’s alpha score for module reliability test was 0.825. These values suggests that DHEM module is reliable and applicable.

DISCUSSION

The module development focused on three constructs based on literature review and two preliminary findings. In the initial survey, findings showed that the number

of teachers who mastered the general knowledge about dyslexia was higher than their knowledge on symptoms, treatment and diagnosis. Although all respondents had equivalent academic qualifications and their overall knowledge was almost equal amongst them, their knowledge about dyslexia were different. The study by Abercrombie (27), stated that there was no relationship between teachers' level of knowledge about dyslexia with their academic qualifications. This study reinforces that the academic qualifications of the teachers do not affect their knowledge about dyslexia. However, their lack of knowledge about dyslexia will have an impact on students. These teachers also have negative perception towards at-risk students especially during class. Research by Ness & Southall stated that among the main reasons of misconceptions that teachers have on students with dyslexia, is that these teachers had lack the knowledge about dyslexia (10). They often regard students with dyslexia as lazy and have mental health problems (11). This shows that teachers' knowledge on dyslexia among children is important.

Consequently, the findings on the prevalence of preschool pupils who were at risk of having dyslexia was 9% and this finding should also be given attention. It is generally known that dyslexia is one of the commonest learning disability among children, with a prevalence ranging from 5 to 17.5% (2). Teachers need to be responsible and concern in identifying at-risk preschool children with dyslexia. Snowling & Hulme (28) claimed that children who have been identified as at-risk for dyslexia by their teachers, have the potential to be successful in their academic achievement. Early identification can help reduce the prevalence of dyslexia among children who are within the schools' education system. Teachers who are also knowledgeable on this topic can also assist parents to identify whether their children are at-risk for dyslexia (29). This implies that teachers play an important role in identifying students with such problems because teachers are the ones who are usually the main player for the success of academic achievement among children with dyslexia.

Therefore, there is a need to design a specific module on dyslexia for preschool teachers, to help them increase their knowledge in identifying at-risk children. The need to design a module corresponds with the research conducted by Kantor (12). In this study, he concluded that teachers' general knowledge and experience is not enough, and they need precise knowledge and more specific training on dyslexia to help them identify students with this learning disability during their teaching process.

In this study we developed a module which conveys the knowledge on dyslexia among teachers. The content of this module combines all the recognized needs assessments, as conducted earlier in this research.

These needs assessments were then used to establish a comprehensive Dyslexia Health Education Module (DHEM) for preschool teachers. The content of the module strengthens the knowledge and understanding about dyslexia among preschool teachers such as its definition, history, characteristics, contributing factors, dyslexia's implication to mental health issues, recognising children with dyslexia as well as intervention for children screened to have dyslexia. The implementation of this module was carried out for 5 weeks with a total duration of 10 hours. This duration was consistent with another research that was conducted on the effectiveness of a healthcare educational intervention (30,31). This module was evaluated by eight experts and scores was more than 70%. According to Sidek & Jamaluddin, the value of content validity with scores more than .70 shows that this module is good and applicable (32). The development of DHEM indicates that the module is reliable and can be applied to preschool teachers.

CONCLUSION

Overall, this research aims to develop Dyslexia Health Education Module (DHEM), to educate preschool teachers on early recognition of at-risk children with dyslexia. The development of this module was based on ADDIE Model and an initial prevalence study showed that preschool teachers, not only had lack of general knowledge but also lack of knowledge on symptoms and intervention for children with dyslexia. Early detection of at-risk school children with dyslexia is important, as early intervention improves the prognosis of this disorder. DHEM, which was found to be a good and reliable model, can be an innovation to increase the knowledge of preschool teachers, parents, healthcare practitioners, educationist as well as society regarding dyslexia. Future longitudinal studies should also be carried out using this module to ensure its effectiveness in the long run.

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