A Cross-sectional Study on Awareness of Dyslexia Disorder among University Students

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Abstract

BACKGROUND: The condition of dyslexia is a learning disability leading to difficulty in acquiring basic skills of reading, spelling, and writing. It is a disorder with a neurological origin that does not affect the intelligence of a person. It is estimated that between 5% and 10% of the population suffering from dyslexia, but this number can also be as high as 17% because dyslexia may not be recognized and diagnosed in some individuals and because some of them may not disclose that they are diagnosed. In Malaysia, it is estimated that 4% to 8% of children attending school have dyslexia. Dyslexics tend to be more artistic and creative than others.

AIM: This study examines the awareness of dyslexia disorder among university students.

METHODS: The data are collected from the participants through self-made survey questionnaires that consist of 25 questions per questionnaire. A descriptive cross-sectional study is conducted from April 2019 to May 2019.

RESULTS: The current study reflected that dyslexia, not a disease, thus it is not curable. Individuals with dyslexia require extra patience and effort from the family members, teachers, as well as the public, especially in their learning process. We believe that a lack of understanding about this disorder by the public will bring negative impacts to dyslexic individuals such as causing unwanted misunderstanding, causing mental stress to the dyslexics, bringing negative impact to their learning processes, and so on.

CONCLUSION: Our study results suggest that the knowledge level of dyslexia among university students considered as lower than average.

Introduction

The word dyslexia is a term that has been used over the years to describe children with literacy difficulties. According to The National Organization for Dyslexia Malaysia, dyslexia is defined as a learning disability leading to difficulty in acquiring the basic skills of reading, spelling, and writing [1]. Dyslexia is a language-based disability, but it is often misunderstood as a disease or an intellectual defect [2]. It is the neurological origin and it is characterized by difficulties with accurate and/or fluent word recognition and poor spelling and decoding abilities and does not affect the intelligence of the person [3]. The high incidence of suicide attempts in adolescents with dyslexia are three times as common as in others of the same age. The rate of anxiety disorders is three times as common and depressive disorders are twice as high [4].

According to The Ministry of Health Malaysia, there are no available statistics for dyslexic students in Malaysia, but it is estimated that 4–8% of children attending school have dyslexia [5]. Dyslexia refers to a cluster of symptoms. There are a few common traits found in dyslexic children, such as having difficulties in spelling, reading, writing, and differentiating words in reverse [6]. Individuals with dyslexia have difficulty in integrating sound and letter. They often get confused with words which have similar sounds. Moreover, they tend to read slow and have difficulties to copy notes from the board. Besides that, these individuals have diminished self-confidence due to their lack of achievement and tend to drift away into other thoughts [7].

Despite that, these individuals are good in art, acting, and more creative than non-dyslexic individuals. People with dyslexia often face social problems, trouble learning, or understanding certain subjects and also show signs of low self-esteem. Despite that, these individuals tend to be better in art, acting, and more creative than the others [8]. Dyslexia is the outcome of multiple risk factors. Including the family history of dyslexia and other learning disabilities, premature birth or low birth weight, exposure to nicotine, drugs, alcohol, or infection that might alter brain development of the fetus and individual differences in the brain that enable reading. There are multiple tests to diagnose dyslexia. They often cover background information, intelligence, word recognition, phonological processing, automaticity and fluency skills, reading comprehension, vocabulary knowledge, family history and development, and oral language skills [9].

Study outcomes

- A cross-sectional study was completed by MAHSA medical students ($n \approx 250$)
- The understanding of dyslexia is still a lower than average when students describe dyslexia
- This result demonstrated that there is no significant association between the age group of participants and their level of awareness of dyslexia
- There is a significant association between gender and dyslexia awareness.

Materials and Methods

The data are collected from the participants through self-made survey questionnaires that consist of 25 questions per questionnaire. A descriptive cross-sectional study is to be conducted from April 2019 to May 2019. All undergraduate students in MAHSA University (Saujana Putra Campus), for example, students from undergraduate courses such as Medicine and Surgery, Dentistry, Pharmacy, Nursing, Accountancy, Business, and Engineering. All samples chosen from undergraduate course students, any postgraduate, and diploma students will not be included in this study. All the staffs and lecturers excluded from this study.

The sampling method to be applied is a non-probability random sampling method. The sample size is set to be 250 participants, it is estimated by applying Cochran equation and Finite population correction method.

Cochran equation: $n0 = \dfrac{Z^2\, pq}{e^2}$

n0=sample size for infinite population, Z=Z score, p=estimated proportion, q= 1-p, e=margin of error).

In this study, the confidence level is set to be 95%; hence, Z=1.65 (13) and e= 1–0.95=0.05. p=0.5, as the expected level of awareness of dyslexia, is assumed to be higher than 50%. q=1-p, q=0.5.

$$n0 = \frac{1.65^2 \times 0.5 \times 0.5}{0.05^2} = 272.25$$

The sample size calculated from this equation is then rounded to 272.

Finite population correction method:

$$n = \frac{n0}{1+\dfrac{n0-1}{N}}$$

(n=sample size for finite population, n0=estimated sample size for infinite population, N=size of population).

The number of undergraduate students from MAHSA University (Saujana Putra Campus) is estimated to be approximately 3000 students. Hence, N=2000.

$$n = \frac{272}{1+\dfrac{272-1}{3000}} = 249.46$$

The calculated sample size is then rounded to 250 students.

This study used several categorical variables. The following categorical variables are the course of study, gender, age group, and year of study (Table 1).

Table 1: Association between level of Knowledge regarding Dyslexia with selected demographic variables

No.	Variables	Description	Type of Variables	Value Units
1.	Course of Study	Course group of the participants	Categorical	1. Medicine 2. Dentistry 3. Pharmacy 4. Biomedical Science 5. Nursing 6. Physiotherapy 7. Medical Imaging 8. Engineering 9. Business 10. Accounting
2.	Gender	Gender of the participants	Categorical	1. Male 2. Female
3.	Age group	Age group of the participants	Categorical	1. <18 2. 18–21 3. >21
4.	Year of study	Year of study of the participants	Categorical	1. 1 2. 2 3. 3 4. 4 5. 5
5.	Awareness	Awareness of dyslexia by the participants	Categorical	1. Aware 2. Not aware

Ethical approval was obtained before the commencement of the study from the Institutional Ethics Committee. The ethics committee approval number is RMC/EC39/2019.

Statistical calculation and data analysis

The questions are generated in a self-made manner by referring to reliable resources and consist of 25 questions. The questions are divided into two

sections (Section A and Section B). Section A includes five multiple-choice questions, whereas Section B includes 20 yes/no questions (each question from both sections consists of only one correct answer). The questionnaire collected back from the participant after he/she finished answering all the questions. The result of each participant evaluated through the scoring system shown below:

- 1 score: question with correct answer
- 0 score: question with wrong answer.

The maximum score considered as 25 of 25 questionnaires and the lowest score is 0 of 25. Any question sheet collected back from any participant which does not have any answer presented is considered as invalid. Participants who answered ≥21 questions are considered as aware of dyslexia. The sample prevalence of dyslexia awareness among MAHSA undergraduates is compared with the hypothesized prevalence using one sample single-tailed t-test. The associations between the parameters and awareness are tested using Fisher's exact test and Pearson's Chi-square test. The result of the tests used by SPSS Version 23.0.

Results

Prevalence of dyslexia awareness among MAHSA undergraduates (regardless course of study, gender, age group, and year of study)

The study recorded a total of 250 valid responses from the participants. Among them, 35.6%% (n = 89) are aware of dyslexia, 64.4% (n = 161) are not aware of dyslexia. Table 2 shows that the prevalence of dyslexia awareness among MAHSA students is 35.6%.

Table 2: Frequency of awareness

Awareness	Frequency	Percent (%)	Valid percent	Cumulative percent
Not aware	161	64.4	64.4	64.4
Aware	89	35.6	35.6	100.0
Total	250	100.0	100.0	-

The null hypothesis set is tested using one-sample single-tailed t-test.

Prevalence of dyslexia awareness among MAHSA undergraduates

Table 3 shows the percentage and number of participants that are aware and not aware of dyslexia among the different course groups of participants. The prevalence of dyslexia awareness studied with undergraduate courses such as Medicine (MBBS), Accounting, Dentistry (DDS), Pharmacy (PHM), Biomedical Science (BioMed), Nursing, Physiotherapy (Physio), Medical Imaging (Med imaging), Engineering, and Business are 0.355, 0.077, 0.439, 0.333, 0.412, 0.429, 0.367, 0.500, 0.200, and 0.000, respectively.

Table 3: Prevalence of dyslexia awareness among undergraduate students

Medical students			
Socio-demographic variables	Awareness		Total
	Not aware	Aware	
Count	40	22	62
% within course	64.5%	35.5%	100.0%
% within awareness	24.8%	24.7%	24.8%
% of total	16.0%	8.8%	24.8%
Accounting students			
Count	12	1	13
% within course	92.3%	7.7%	100.0%
% within awareness	7.5%	1.1%	5.2%
% of total	4.8%	0.4%	5.2%
Dental			
Count	37	29	66
% within course	56.1%	43.9%	100.0%
% within awareness	23.0%	32.6%	26.4%
% of Total	14.8%	11.6%	26.4%
Pharmacy			
Count	20	10	30
% within course	66.7%	33.3%	100.0%
% within awareness	12.4%	11.2%	12.0%
% of total	8.0%	4.0%	12.0%
Biomedical science			
Count	10	7	17
% within course	58.8%	41.2%	100.0%
% within awareness	6.2%	7.9%	6.8%
% of total	4.0%	2.8%	6.8%
Nursing			
Count	4	3	7
% within course	57.1%	42.9%	100.0%
% within awareness	2.5%	3.4%	2.8%
% of total	1.6%	1.2%	2.8%
Physiotherapy			
Count	19	11	30
% within course	63.3%	36.7%	100.0%
% within awareness	11.8%	12.4%	12.0%
% of total	7.6%	4.4%	12.0%
Medical imaging			
Count	5	5	10
% within course	50.0%	50.0%	100.0%
% within awareness	3.1%	5.6%	4.0%
% of total	2.0%	2.0%	4.0%
Engineering			
Count	4	1	5
% within course	80.0%	20.0%	100.0%
% within awareness	2.5%	1.1%	2.0%
% of total	1.6%	0.4%	2.0%
Business			
Count	10	0	10
% within course	100.0%	0.0%	100.0%
% within awareness	6.2%	0.0%	4.0%
% of total	4.0%	0.0%	4.0%
Total			
Count	161	89	250
% within course	64.4%	35.6%	100.0%
% within awareness	100.0%	100.0%	100.0%
% of total	64.4%	35.6%	100.0%

Awareness of dyslexia in different age groups

Table 4 shows that the prevalence of dyslexia awareness within the age group of below 18 years old, age between 18 and 21, and above 21 years old is 0.500, 0.333, and 0.389, respectively.

Table 4: Age groups * awareness cross-tabulation

Age groups	Awareness		Total
	Not aware	Aware	
<18			
Count	1	1	2
% within age groups	50.0%	50.0%	100.0%
18–21			
Count	102	51	153
% within age groups	66.7%	33.3%	100.0%
>21			
Count	58	37	95
% within age groups	61.1%	38.9%	100.0%
Total			
Count	161	89	250
% within age groups	64.4%	35.6%	100.0%

Awareness of dyslexia in male and female

Table 5 shows that the prevalence of dyslexia awareness of male and female participants is 0.256 and 0.401, respectively.

Awareness of dyslexia in YOS

Table 6 shows that the prevalence of dyslexia awareness of year 1, year 2, and year 3 students is 0.340, 0.350, and 0.410, respectively.

Table 5: Gender * awareness cross-tabulation

Gender	Variable	Awareness		Total
		Not aware	Aware	
Male	Count	58	20	78
	% within gender	74.4%	25.6%	100.0%
Female	Count	103	69	172
	% within gender	59.9%	40.1%	100.0%
Total	Count	161	89	250
	% within gender	64.4%	35.6%	100.0%

Table 7 shows that the association testing between the course of study, age group, gender, and year of study with awareness is 0.176, 0.177, 0.032, and 0.361, respectively.

Table 6: YOS * awareness

Response	Year of study	Variable	Awareness		Total
			Not aware	Aware	
YOS	1	Count	62	32	94
		% within YOS	66.0%	34.0%	100.0%
	2	Count	76	41	117
		% within YOS	65.0%	35.0%	100.0%
	3	Count	23	16	39
		% within YOS	59.0%	41.0%	100.0%
Total		Count	161	89	250
		% within YOS	64.4%	35.6%	100.0%

Result of association testing between the parameters (course of study, age group, gender, and year of study of participants) and awareness of dyslexia of participants.

Table 7: Result of association testing between the parameters set and awareness

Parameters	Types of test used	Value	p-value (single-sided)
Course of study	Fischer's exact test	9.992	0.176
Age group	Fischer's exact test	2.102	0.177
Gender	Pearson's Chi-square test	3.926	0.032
Year of study	Pearson's Chi-square test	0.725	0.361

Discussion

Among 250 participants, 89 (35.6%) students are aware and 161 (64.4%) students are not aware of dyslexia [10]. Globally, among the population 15 % of individuals affected by the developmental dyslexia. The sample prevalence is compared with the hypothesized prevalence of dyslexia awareness (50%) using a one-sample single-tailed t-test. Hence, the null hypothesis is rejected and the alternative hypothesis is accepted which stated that the prevalence of dyslexia awareness among university students is <0.5 within a confidence level of 95%. It is clear that the majority of undergraduate students not well aware of dyslexia disorder [2]. The association testing between the course of study and awareness of dyslexia is tested using Fisher's exact test which is an alternative of Pearson's Chi-square test.

The association testing between the parameters set and awareness, the course of the study showed that p = 0.176 which more than 0.05; thus, the null hypothesis is accepted and alternative hypothesis is rejected. The results suggest that there is no significant association between the course of study and awareness of dyslexia in university undergraduate students [11]. Another association test has done between age group and awareness using Fisher's exact test. The probability value is 0.177 which is more than 0.05; thus, null hypothesis is accepted and alternative hypothesis is rejected. This result demonstrated that there is no significant association between the age group of participants and their level of awareness of dyslexia [12].

The third association testing was done using Pearson's Chi-square test. p-value of this test is 0.032 which is <0.05; thus, the null hypothesis is rejected and the alternative hypothesis is accepted which says that there is a significant association [13] between the gender group of participants and level of awareness of dyslexia. Finally, the association testing was done using Pearson's Chi-square test as well. The result showed that p = 0.361; thus, the null hypothesis is accepted and the alternative hypothesis is rejected. The study results reflected that there is no significant association between year of study of students with a level of awareness [14] of dyslexia. With all the parameters, study results showed that the gender group is the only parameter that shows a significant association with the level of dyslexia awareness.

Conclusion

The current study suggests that a majority of students not aware of dyslexia disorder. The research results show that the understanding of dyslexia is very minimum level when correlates with the course of study, age group, and year of study. The understanding of dyslexia is still lower than average when students describe dyslexia. Moreover, findings from this research reflected that the implementation of awareness such as study courses, seminars, and visual aids must be encouraged by educators and to raise awareness of the dyslexia disorder among university students.

Authors' Contribution Statement

VS and NKC conceived of the presented idea and wrote the main manuscript draft. PNH, DS, and GS carried out the study. LPQ, MMMA, WYS, RRRP, and RMZ developed the questionnaires. VKS and NKC performed the statistical analysis. VS and NKC verified the statistical analysis. All authors discussed the results and contributed to the final manuscript.

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