



Knowledge and Awareness of Elementary School Teachers about Reading Disability (Dyslexia) in Kingdom of Saudi Arabia, Medina 2018

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: For several years teachers have been concerned about students who appear normal, intelligent, and healthy, but struggle with reading and learning to read and write. These difficulties are identified under the concept of dyslexia [1]. Dyslexia is defined as learning disability that is neurobiological in origin. It is characterized by problems with fluent word recognition and by poor spelling and interpreting skills.

Rationale of Study: Dyslexia appears to be the most common learning disability in mainstream schools since the average number of children with dyslexia universally appears to be between 10-15% of the population [19].

Objectives of the Study: To assess Knowledge and Awareness of al-medina elementary school teachers about reading disability (dyslexia).

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Methodology: Cross sectional study.

This study was conducted in al-Medina city. It is located at the north western region of kingdom of Saudi Arabia. Al-Medina city has 208 Elementary female schools and 181 Elementary male schools (published in ministry of education website 1438 The study population included female and male Saudi teachers in primary schools in Al-Medina the total population (Saudi female and male teachers in primary schools) 10,522 expected frequency =50% at 95% confidence level the sample size =371 (calculated by using survey software A self-reported questionnaire was give to primary schools teachers.

Results: A total of 380 teachers of elementary school in Madinah city, Saudi Arabia were included in the study. The personal characteristics of the studied subjects are presented in Table 1. The mean (\pm SD) age of the studied teachers was 40.6(\pm 6.2) years and age ranged from 25-59 years. About 41.6% were above the age of 40 years and about half of the studied teachers were males (51.3%). The majority were married (92.6%), and had more than 3 children. The majority had bachelor degree (72.6%). Almost all the studied teachers reported to have monthly income of more than 8000 SR (97.1%). More than half of the studied teachers were teaching Arabic and Islamic subjects (56.8%), 22.4% of the teachers were teaching science and Mathematics. Teachers with work experience > 10 years were representing 58.2% of the studied sample with the mean years of experience was 8.4 ± 4.6 (1-19 years).

Conclusions: The present study revealed that good level of knowledge on dyslexia among the studied elementary school teachers in Madinah City to account (42.9%). The results showed also that the majority of teachers to have positive opinion about the need of educational program and special training courses on dyslexia. Although not significant, good level of knowledge on dyslexia was varied by the socio-demographic characteristics of the studied teachers. The higher level was among teachers aged ≤ 40 years, male teachers, married teachers, teachers having 1-3 children, teachers having bachelor degree. The highest percent of good knowledge was found among science and mathematics teachers.

Keywords: Dyslexia; psychosocial problems learning disability neurological disorder; neurodegenerative disorder; abnormalities.

1. INTRODUCTION

“For several years teachers have been concerned about students who appear normal, intelligent, and healthy, but struggle with reading and learning to read and write. These difficulties are identified under the concept of dyslexia” [1]. “Dyslexia is defined as learning disability that is neurobiological in origin. It is characterized by problems with fluent word recognition and by poor spelling and interpreting skills. These problems typically result from a deficit in the phonological component of language that is often unpredicted in relation to other cognitive abilities” [2].

“The cause of dyslexia are not clear, most persons with dyslexia have been found to have difficulty with recognizing the separate speech sounds within a word and/or learning how letters represent those sounds, a key factor in their reading difficulties. Dyslexia is not related to intelligence or desire to learn; with suitable teaching ways, individuals with dyslexia can learn effectively” [3].

A person with dyslexia is an intelligent, poor-reader [4].

1.1 Prevalence

“dyslexia affect 10-15%of English speaking populations” [5]. “Study done in Mysore (India) the overall prevalence of dyslexia was found to be 13.67%” [6]. “Prevalence was found to be 6.30% in a similar study done among first to sixth grade students at Wat Samiannaree School in Thailand by Roongpraiwan” [7].

“A similar study done in Hong Kong among school age children, the prevalence of dyslexia is estimated to be 9.70–12.00%” [8].

Kuwait Dyslexia Association (KDA)(20040 has showed that rate of dyslexia6.3% of students in elementary schools in Kuwait [1].

1.2 Risk Factors

1.2.1 Genetic studies

“Early studies by researchers such as Orton and Hallgren showed evidence that dyslexia has a strong genetic link” [9].

“the risk of dyslexia is eight times higher in children where there is a parental history of reading difficulties.” (p.21)(10). “Study done in Mysore (India) overall prevalence of dyslexia was found to be 13.67%. When compared with gender, prevalence of dyslexia was 19.00 % among males and 8.50% among females” [6]. “Various studies are all consistent with having the number of male dyslexics being more than female dyslexics. Study conducted by Saviour and Ramachandra” [9]. “on modes of genetic transmission of dyslexia in South Indian families among 109 individuals in Karnataka, prevalence among males and females were 62.39% and 38.53%, respectively. In other studies too it was observed that males are more affected than females (1.6:1)” [10,11]. Similar study done by Roongpraiwan on primary school students in Thailand noticed male to female ratio of dyslexia was 3.4:1 [7].

1.2.2 Family history

About 66.70% dyslexics gave a family history of dyslexia present either in their parents or siblings. Similar studies done by Pennington and Gilger [12] demonstrated the rate of dyslexia among siblings to be approximately 40.00% and among parents to be 27.00–49.00%. Many studies have been done on familiarity which suggest that genetic factors play a significant role in predisposition of dyslexia [13,14] Hallgren observed autosomal dominant transmission of dyslexia in 80.00% of the families studied [15]. Similar observation of autosomal dominance was seen by Pennington et al.

1.2.3 Impact of dyslexia

Academic problems are related to a wide range of psychosocial problems, such as inattentiveness, low motivation for schoolwork, dropping out of school, fear of failure, depression, anxiety, loneliness, low self-esteem, and poor peer relations [16]. In 1996, Forness and Kavale [11] reported findings from a meta-analysis study on 152 studies about the nature of social skill deficits among learning disabled students. children with learning disabilities be likely to to manifest socially withdrawn behavior and increased levels of hyperactivity and distractibility [17]. Higher levels of stress rate were found in mothers of children affected by DD respect of healthy children. Particularly, mothers of DD children showed higher scores in all domains of PSI-SF(Parenting Stress Index—

Short Form.)than mothers of typically developing children [18].

1.2.4 Rationale of study

Dyslexia appears to be the most common learning disability in mainstream schools since the average number of children with dyslexia universally appears to be between 10-15% of the population [19].

which it has not received adequate attention in developed countries such as kingdom of Saudi Arabia. Knowledge about learning disorders among elementary school teachers may play a major role in early identification and management of children with disorder [20].

1.3 Objectives of the Study

1.3.1 General objectives

To assess Knowledge and Awareness of al-medina elementary school teachers about reading disability (dyslexia).

1.3.2 Specific objectives

To assess the Awareness about dyslexia among Elementary School Teachers.

To assess the Knowledge about dyslexia among Elementary School Teachers.

To assess the Awareness about dyslexia across socio-demographic data.

To assess Knowledge about dyslexia across socio-demographic data.

To determine the source of information about dyslexia.

1.3.3 literature review

In Kuwait2012 Aladwani AM carried out study to assess the awareness of teachers about early signs of dyslexia.

The population of this study were 700 teachers of primary schools. Data were collected through the use of a survey administered to the participants.

“The results shows the teachers lack knowledge and a awareness of the early signs of dyslexia. Only 6.9% having a high level of knowledge. Only 5% of the sample had read more than 4 times About dyslexia, (19.9 %) of the sample who never researched about dyslexia. On the other hand, when teachers were asked about their institutional preparation, there was (37.1%) who had never taken any workshop about dyslexia .68% of the teachers attended two

workshops or less about students' learning difficulties., 45% reported never having courses from the Ministry of Education about dyslexia reported never having taken or having taken only one workshop. both genders showed no statistical differences in the level of Awareness" [1].

In Riyadh 2017, study done: To assess the awareness of teachers in primary schools about dyslexia, included 500 teachers of elementary public and private schools in Riyadh city. . Data were collected through A questionnaire.. Results: show the majority of teachers were aware of the term dyslexia, but fair level of knowledge .a result show no difference in awareness and knowledge based in demographic variables [20].

In 2021, Washburn et al. [21] assess the Teachers knowledge of basic language concept and dyslexia in elements schools participate of teacher 99,k-5 in 10 different schools in districts in Midwestern state in united states and 86k-5 from urban schools district in southwest .used survey to assess the teachers knowledge of basic language concept and dyslexia. Results show that teachers, low level of knowledge of (phonics principles). Also, teachers have misconception that dyslexia is a visual processing deficit rather than phonological processing deficit.

Erin K. Washburn, et al (2013) in USA examine the knowledge base of pre-service teachers from the USA and the UK of dyslexia

A survey (both US and UK versions) was constructed. One hundred and one pre-service teachers from the USA and 70 pre-service teachers from the UK were administered the survey. UK and USA teachers have same level of knowledge about dyslexia and showing same misunderstandings about dyslexia [22].

Wadlington and Wadlington (2005) this study were to use the scale to investigate the beliefs of educators regarding dyslexia.

Participants included university faculty as 250 well as undergraduate and graduate students preparing to become administrators, counselors, elementar,secondary general education teachers, elementar.

The result show that that overall all types of educators in this study) had a poor understanding of dyslexia [19].

In 2010, study done to investigate teachers and surveying PSTs' (teacher trainees) attitudes towards dyslexia and students with dyslexia.

In addition to An over whelming majority of the 404 PSTs disagreed 'The word dyslexia is an excuse for laziness', 56% of PSTs felt that they should have received more training and workshops about dyslexia and working with children with dyslexia.

Shetty and Rai [23] in India carried out study to assess the awareness and knowledge of dyslexia in Elementary school teachers .314 teacher was share in this study and given self-reported questioner.

261 teacher were aware of term of dyslexia .24 teacher had prior training about dyslexia only 1in 3 teachers had adequate knowledge about dyslexia [23].

Thompson [24] in South Africa, 2013 carried out a study aimed to assessing teacher awareness of dyslexia in mainstream high school settings in the Western

"The sample included 16 mainstream high schools in the Westernquestionnaire was used to collect data The results showed that teachers had acceptable knowledge of dyslexia, said they are able to identify and manage dyslexia, and believed. that they received little or no pre-service and in-service training in dyslexia. The main. conclusion that can be drawn is that teachers need on-going adequate pre-service and in service training in the field of dyslexia" [24].

2. METHODOLOGY

2.1 Study Setting

This study was conducted in al-Medina city .it is located at the north western region of kingdom of Saudi Arabia. Al-Medina city has 208 Elementary female schools and 181 Elementary male schools (published in ministry of education website 1438).

2.2 Study Population

The study population included female and male Saudi teachers in primary schools in Al-Medina.

2.3 Inclusion Criteria

All female and male Saudi teachers in primary schools in Al-Medina.

Chart 1. Diagnostic Criteria

Diagnostic Criteria

Difficulty in learning to write the alphabet correctly in sequence
Difficulty in learning and remembering printed words
Reversal of letters or sequences of letters, or mirror writing
Difficulty in learning to read
Difficulty in reading comprehension
Difficulty in communicating with other children
Repeated erratic spelling errors
Delay in spoken language
Difficulty in pronouncing words in a right way
They are hyperactive
Maybe late in establishing preferred hand for writing
May be late in learning right and left and other directionality components
Problems in learning the concepts of time and temporal sequencing

2.4 Exclusion Criteria

Special needs schools.

2.5 Sample Size

the total population (Saudi female and male teachers in primary schools) 10,522
expected frequency =50% at 95% confidence level the sample size =371 (calculated by using survey software).

2.6 Sampling Method

stage 1:dividing schools in Al-Medina into four sectors (northern,southern,eastern and western.
stage 2: select six schools from each sector by simple random sampling.
stage 3: all teachers from selected schools was be included and invited to voluntarily participate in the study.

2.7 Study Tool

the questionnaire was used in other study
Permission letter was sent to the author and acceptance letter for permeation is gained.
A self-reported questionnaire was give to primary schools teachers.

First, the questionnaire started with socio-demographic data Secondly questions to assess awareness was organized in table manner with three answer options were the high score for positive answer and lowest for negative one. The table included signs and symptoms of dyslexia The second page of questionnaire concern about the source of knowledge the teachers got about dyslexia [20].

2.8 Pilot Study

Pilot study was be conducted before data collection and modification was did according to results . to estimate time needed to complete questionnaires and to check easiness of vocabularies from participants side. participants was excluded from study sample and was around 30 teachers .

2.9 Time Line and Plan

The study was conducted from period of February 2018 up to May 2019

2.10 Proposal Writing and Preparation

21jan 2018 to 14 Feb 2018

2.11 Data Collection

March 2019 to april 2019

2.12 Data Analysis and Reporting

May 2019 to june 2019

2.13 Budget

Self-funded.

2.14 Statistical Analysis

The statistical analysis was done using SPSS software, version 22.0, for Windows (SPSS, Inc., Chicago, IL). The data were tabulated and presented in frequency number and percent and mean \pm standard deviation. The frequency of

corrected knowledge about dyslexia were tabulated. Chi square and Fischer exact test were used as appropriate to compare the studied knowledge items about dyslexia by socio-demographic characteristics of the studied teachers (age, sex, educational degree, years of experience and teaching filed).

Level of knowledge about dyslexia were classified into good and poor according to the median of the of the total correct answers of the knowledge items (n= 16). Poor knowledge were included teachers with correct answers of less than median, and good knowledge included teachers with correct answers \geq median.

Independent t test and one-way ANOVA analysis were also used to compare the mean knowledge scoring (16 items) by the studied teachers' characteristics. The level $P < 0.05$ was considered as the cut-off value for significance.

3. RESULTS

A total of 380 teachers of elementary school in Madinah city, Saudi Arabia were included in the study. The personal characteristics of the studied subjects are presented in Table 1. The mean (\pm SD) age of the studied teachers was 40.6(\pm 6.2) years and age ranged from 25-59 years. About 41.6% were above the age of 40 years and about half of the studied teachers were males (51.3%). The majority were married(92.6%), and had more than 3 children. The majority had bachelor degree(72.6%). Almost all the studied teachers reported to have monthly income of more than 8000 SR (97.1%). More than half of the studied teachers were teaching Arabic and Islamic subjects (56.8%), 22.4% of the teachers were teaching science and Mathematics. Teachers with work experience > 10 years were representing 58.2% of the studied sample with the mean years of experience was 8.4 ± 4.6 (1-19 years).

Table 2 presents the distribution of the studied teachers by their relation with dyslexia. The majority heard about dyslexia (82.1%). About quarter of the teachers have reported to have relative with dyslexia (23.9%), while more than half of them (54.7%) reported to ever have dyslexic child in their class.

Table 3 shows teachers' knowledge about dyslexia. The prevalence of correct answers were high regarding most of the studied knowledge items about the dyslexia. The correct answers were the highest for two items namely " May be late in learning right and left and other directionality components such as up-down, front- behind, East, West, etc." and Dyslexic children have auditory problems (78.4% and 77.4% respectively). However, the correct answers were low and less than 50% of the studied teachers knew correctly. The lowest correct answer was for the knowledge item named " Problems in learning the concepts of time" where only 29.2% of the studied teachers knew correctly the answer.

Table 4 shows level of knowledge about dyslexia among the studied teachers by their socio-demographic factors. No statistically significant difference of level of knowledge were observed among the studied teachers by their characteristics. However good level of knowledge about dyslexia was found among teachers aged ≤ 40 years (44.6%), male teachers (43.6%), married (43.2%), having 1-3 children (44.5%), teachers having bachelor degree (43.8%). The highest percent of good knowledge was found among science and mathematics teachers (49.9%).

Table 5 shows the mean knowledge scoring about dyslexia among the studied teachers. Distribution by the studied teachers' characteristics did not show any statistically significant differences. However, the highest mean scoring was found among teachers aged ≤ 40 years, male teachers, bachelor degree, work experience > 10 years and teachers of science and mathematics with mean scoring of 10 and more.

Table 6 shows the sources of knowledge about dyslexia among the studied teachers. About two-thirds of the studied teachers (68.2%) reported to know about dyslexia as personal acquisition. About quarter (24.2%) of the studied teachers have received their knowledge during college study. Other source of knowledge of the studied teachers was educational campaign and special training course representing 16.3% and 13.2%, respectively.

Table 1. Personal characteristics of the teachers (n= 380)

Characteristics [*]	n (%)
Age in years; mean ± SD (Range)	40.7 ± 6.2 (25-59)
Age in years	
≤ 40	222 (58.4)
>40	158 (41.6)
Sex	
Female	185 (48.7)
Male	195 (51.3)
Marital status	
Married	352 (92.6)
Not married ^{**}	28 (7.4)
Number of children	
1-3	180 (47.3)
> 3	200 (52.6)
Educational level	
Bachelor degree	276 (72.6)
Diploma	104 (27.1)
Monthly income in SR	
≤8000	11 (2.9)
> 8000	369 (97.1)
Work experience in years	
≤ 10	159 (41.8)
> 10	221 (58.2)
Work experience in years; mean ± SD (Range)	8.4 ± 4.6 (1-19)
Teaching field	
Arabic and Islamic	216 (56.8)
Science and Math.	85 (22.4)
Others ^{***}	79 (20.8)

^{*}Data are presented by the mean ± SD or by n (%).

^{**}Not married teachers including 19 single and 9 divorced

^{***}Others included 23 teaching sfof, 33 teaching history, 10teaching English, and 13 religion

Table 2. Distribution of the studied teachers by their relation with Dyslexia (n= 380)

Item	n(%)
Have you ever heard of dyslexia?	
Yes	312(82.1)
No	86(17.9)
Have you ever have any relative with dyslexia?	
Yes	91(23.9)
No	289(76.1)
Have you ever have any child with dyslexia in your class?	
Yes	208(54.7)
No	172(45.3)

Table 3. Knowledge about dyslexia among the studied teachers (n= 380)

Knowledge items	Correct answer	Correct answer, n (%)*
Difficulty in learning to write the alphabet correctly in sequence.	Yes	246 (64.7)
Difficulty in learning and remembering printed words.	Yes	257 (67.6)
Reversal of letters or sequences of letters, or mirror writing	Yes	182 (47.9)
Dyslexia cannot be diagnosed until 3 rd grade	No	262 (68.9)
Difficulty in learning to read	Yes	269 (70.8)
Difficulty in reading comprehension	Yes	238 (62.6)
Repeated erratic spelling errors	Yes	270 (71.1)
They have a vision problems	No	289 (76.1)
Delay in spoken language	Yes	153 (40.3)
Difficulty in speaking the right word when speaking	Yes	175 (46.1)
May be late in learning right and left and other directionality components such as up-down, front-behind, East, West, etc.	Yes	298 (78.4)
May be late in establishing the preferred hand for writing	Yes	282 (74.2)
Dyslexic children have auditory problems .	No	294 (77.4)
Can't think at a high level in mathematics, but can do simple calculations	No	207 (54.5)
Problems in learning the concepts of time	No	111 (29.2)
There intelligence level is lesser than their classmates	No	258 (67.9)

Table 4. Level of knowledge about dyslexia among the studied teachers by their socio-demographic characteristics (n= 380)

Socio-demographic characteristics	Level of knowledge		P value
	Good (n= 163)	Poor (n=217)	
Teacher's age in years			
≤ 40	99 (44.6)	123 (55.4)	0.43
>40	64 (40.5)	94 (59.5)	
Sex			
Female	78 (42.2)	107 (57.8)	0.78
Male	85 (43.6)	110 (56.4)	
Marital status			
Married	152 (43.2)	200 (56.8)	0.68
Not married	11 (39.3)	17 (60.7)	
Number of children			
1-3	80 (44.5)	100 (55.5)	0.56
> 3	83 (41.5)	117 (58.5)	
Educational level			
Bachelor degree	121 (43.8)	155 (56.2)	0.59
Diploma	42 (40.8)	62 (59.2)	
Work experience in years			
≤ 10	68 (42.8)	91 (57.2)	0.97
> 10	95 (43.0)	126 (57.0)	
Teaching field			
Arabic	89 (41.2)	127 (58.8)	0.39
Science and Mathematics	42 (49.4)	43 (50.6)	
Others	32 (40.5)	47 (59.5)	

Table 5. Mean knowledge scoring about dyslexia among teachers by socio-demographic characteristics (n= 380)

	Mean ± SD	P value
Teacher's age in years		
≤ 40	10.0 ± 1.9	0.93
>40	9.9 ± 2.0	
Sex		0.97
Female	9.9 ± 2.1	
Male	10.0 ± 1.9	
Marital status		0.89
Married	10.0 ± 2.0	
Not married	9.9 ± 1.9	
Number of children		0.61
1-3	9.9 ± 1.9	
> 3	10.0 ± 2.0	
Educational level		0.25
Bachelor degree	10.1 ± 2.0	
Diploma	9.7 ± 1.9	
Work experience in years		0.29
≤ 10	9.8 ± 2.0	
> 10	10.1 ± 1.9	
Teaching field		0.61
Arabic	9.9 ± 1.9	
Science and Mathematics	10.2 ± 2.1	
Others	9.8 ± 1.9	

Table 6. Source of knowledge about dyslexia among the studied teachers (n= 380)

Source of knowledge	N (%)
Personal acquisition	259 (68.2)
Educational campaign	62 (16.3)
Special training course	50 (13.2)
College study	92 (24.2)

Table 7. Teachers opinion towards dyslexia (n= 380)

Teachers opinion	N (%)
What is the appropriate thing to do while dealing with dyslexic child ?	
Informing the parents	235 (61.8)
Informing the principle	65 (17.1)
Informing the academic adviser	172 (45.3)
Refer the child to the early diagnosis center	202 (53.2)
Do nothing	36 (9.5)
Do you think that you need a workshop about the right way of dealing with dyslexic child?	
Yes	309 (81.3)
No	71 (18.7)
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?	
Yes	323 (85.0)
No	57 (15.0)
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?	
Yes	308 (81.1)
No	72 (18.9)

shows the teachers opinion towards dyslexia. The teachers opinion regarding the appropriate thing the teachers do while dealing with dyslexic child include the information of parents (61.8%), informing academic advisor (45.3%), refer the child to the early diagnosis center (53.2%), and only 9.5% reported to do nothing. The opinion of the studied teachers towards the need of them and other teachers of the elementary school to a workshop about the right way to deal with

dyslexic child was high representing 81.3% and 85%, respectively. Also, 81.1% of the studied teachers think that it is necessary to have a teacher's with special training for dyslexic children in the elementary school.

Table 8 shows teachers opinion towards dyslexia by their age groups. For all studied opinion items, the analysis showed no statistically significant difference by age group of the studied teachers.

Table 8. Teachers opinion towards dyslexia by their age groups (n= 380)

Teachers' opinion	Age groups		P value
	≤ 40 (n= 222)	> 40 (n 158)	
What is the appropriate thing to do while dealing with dyslexic child ?			
Informing the parents	137 (61.7)	98 (62.0)	0.98
Informing the principle	34 (15.4)	31 (19.6)	0.33
Informing the academic adviser	95 (42.8)	77 (48.7)	0.25
Refer the child to the early diagnosis center	117 (52.7)	85 (53.8)	0.69
Do nothing	23 (10.4)	13 (8.2)	0.34
Do you think that you need a workshop about the right way of dealing with dyslexic child?			
Yes	177 (80.1)	132 (83.5)	0.42
No	45 (19.9)	26 (16.5)	
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?			
Yes	187 (84.2)	136 (86.1)	0.41
No	35 (15.8)	22 (13.9)	
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?			
Yes	179 (80.6)	129 (81.6)	0.80
No	43 (19.4)	29 (18.4)	

Table 9. Teachers opinion towards dyslexia by their sex (n= 380)

Teachers opinion	Teachers' sex		P value
	Female (n= 185)	Male (n= 195)	
What is the appropriate thing to do while dealing with dyslexic child ?			
Informing the parents	127 (68.6)	108 (55.4)	0.01*
Informing the principle	34 (18.4)	31 (16.0)	0.53
Informing the academic adviser	90 (48.6)	82 (42.1)	0.19
Refer the child to the early diagnosis center	105 (56.8)	97 (49.7)	0.26
Do nothing	23 (12.4)	15 (7.7)	0.46
Do you think that you need a workshop about the right way of dealing with dyslexic child?			
Yes	142 (77.2)	167 (85.6)	0.03*
No	42 (22.8)	28 (14.4)	
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?			
Yes	159 (85.9)	164 (84.1)	0.48
No	25 (14.1)	31 (15.9)	
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?			
Yes	150 (81.1)	158 (81.0)	0.98
No	35 (18.9)	37 (19.0)	

*Significant

Table 9 shows teachers opinion towards dyslexia by their sex (females vs. males). Female teachers who reported to inform the parents while dealing with a dyslexic child were significantly higher compared with male teachers(68.6% vs. 55.4%, p value= 0.01). The response of male teachers regarding opinion

towards the need of them to a workshop about the right way to deal with dyslexic child was significantly higher compared to female teachers (85.6% vs. 77.2, p value= 0.03). Other studied opinions items, however, no significant differences were observed between female and male teachers.

Table 10. Teachers opinion towards dyslexia by their marital status (n= 380)

Teachers opinion	Marital status		P value
	Married (n= 352)	Not married (n= 28)	
What is the appropriate thing to do while dealing with dyslexic child ?			
Informing the parents	218 (61.9)	17 (60.7)	0.89
Informing the principle	62 (17.7)	3 (10.7)	0.35
Informing the academic adviser	159 (45.2)	13 (46.4)	0.89
Refer the child to the early diagnosis center	191 (54.3)	11 (39.3)	0.001*
Do nothing	35 (9.9)	1 (3.6)	0.01*
Do you think that you need a workshop about the right way of dealing with dyslexic child?			
Yes	287 (81.8)	22 (78.6)	0.67
No	64 (18.2)	6 (21.4)	
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?			
Yes	302 (85.8)	21 (75.0)	0.27
No	50 (14.2)	7 (25.0)	
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?			
Yes	286 (81.3)	22 (78.6)	0.73
No	66 (18.7)	6 (21.4)	

*Significant

Table 9 shows teachers opinion towards dyslexia by their marital status. Married teachers who reported to refer the child to early diagnosis center while dealing with a dyslexic child were significantly higher compared with not married teachers(54.3% vs. 39.3%, p value= 0.001). Also, the answer on

the item "to do nothing" when dealt with a dyslexic child was significantly higher among married teachers (9.9% vs. 3.6%, p value = 0.01). For other studied opinions items, however, no significant differences were observed between married and unmarried teachers

Table 11. Teachers opinion towards dyslexia by their educational level (n= 380)

Teachers opinion	Educational level		P value
	Bachelor (n= 276)	Diploma (n= 104)	
What is the appropriate thing to do while dealing with dyslexic child ?			
Informing the parents	172 (62.3)	62 (60.2)	0.82
Informing the principle	48 (17.5)	17 (16.5)	0.88
Informing the academic adviser	122 (44.2)	49 (47.6)	0.45
Refer the child to the early diagnosis center	140 (50.7)	61 (59.2)	0.40
Do nothing	24 (8.7)	12 (11.7)	0.03*
Do you think that you need a workshop about the right way of dealing with dyslexic child?			
Yes	225 (81.8)	84 (80.9)	0.85
No	51 (18.2)	20 (19.1)	
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?			
Yes	239 (86.6)	84 (80.9)	0.35
No	37 (13.4)	20 (19.1)	
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?			
Yes	223 (80.8)	85 (81.9)	0.87
No	53 (19.2)	19 (18.1)	
			*Significant

Table 9 shows teachers opinion towards dyslexia by their educational level. Teachers with bachelor degree who reported "do nothing" while dealing with a dyslexic child were significantly lower compared with teachers with diploma

(8.7% vs. 11.7%, p value= 0.03). For other studied opinions items, however, no significant differences were observed between the studied teachers by their educational level.

Table 12. Teachers opinion towards dyslexia by their work experience years (n= 380)

Teachers opinion	Experience years		P value
	≤ 10 (n= 159)	> 10 (n= 221)	
What is the appropriate thing to do while dealing with dyslexic child ?			
Informing the parents	93 (58.5)	142 (64.3)	0.25
Informing the principle	24 (15.1)	41 (18.6)	0.36
Informing the academic adviser	64 (40.3)	108 (48.4)	0.10
Refer the child to the early diagnosis center	85 (53.5)	117 (52.9)	0.49
Do nothing	16 (10.1)	20 (9.0)	0.29
Do you think that you need a workshop about the right way of dealing with dyslexic child?			
Yes	128 (81.0)	181 (81.9)	0.83
No	31 (19.0)	40 (18.1)	
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?			
Yes	134 (84.3)	189 (85.5)	0.63
No	25 (15.7)	32 (14.5)	
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?			
Yes	130 (81.8)	178 (80.5)	0.76
No	29 (18.2)	43 (19.5)	

Table 12 shows teachers opinion towards dyslexia by their work experience years. For all studied opinion items, the analysis showed no

statistically significant difference by work experience of the studied teachers.

Table 13. Teachers opinion towards dyslexia by their teaching field (n= 380)

Teachers opinion	Teaching field			P value
	Arabic (n= 216)	Science& Math. (n= 85)	Others (n= 79)	
What is the appropriate thing to do while dealing with dyslexic child ?				
Informing the parents	132 (61.1)	51 (60.0)	52 (65.8)	0.70
Informing the principle	34 (15.8)	14 (16.5)	17 (21.5)	0.50
Informing the academic adviser	95 (44.0)	37 (43.5)	40 (50.6)	0.55
Refer the child to the early diagnosis center	121 (56.0)	44 (51.8)	37 (46.8)	0.62
Do nothing	20 (9.3)	10 (11.8)	6 (7.6)	0.40
Do you think that you need a workshop about the right way of dealing with dyslexic child?				
Yes	178 (82.4)	70 (82.2)	60 (75.9)	0.35
No	38 (17.6)	15 (17.8)	19 (24.1)	
Do you think that teachers of elementary schools need a workshop about the right way of dealing with dyslexic child ?				
Yes	179 (82.9)	76 (89.4)	68 (86.1)	0.18
No	37 (17.1)	9 (10.6)	11 (13.9)	
Do you think that it is necessary to have a teacher's with special training for dyslexic children ?				
Yes	181 (83.8)	67 (78.8)	60 (75.9)	0.26
No	35 (16.2)	18 (21.2)	19 (24.1)	

Table 8 shows teachers opinion towards dyslexia by their teaching field. For all studied opinion items, the analysis showed no statistically significant difference by their teaching field the Ministry of Education.

4. DISCUSSION

Dyslexia is defined as learning disability that is neurobiological in origin. It is estimated to affect 5-10% of the worldwide population, and it is so of great importance that teachers have an accurate understanding of what dyslexia is and how it effects their students [25]. Awareness and knowledge about dyslexia among people in contact with dyslexic child such as teachers in elementary school children are of importance in the early diagnosis and management of this

disorder. The earlier the dyslexia is identified, the sooner the family and the school will have more opportunities to alleviate difficulties [26].

The present cross sectional study was conducted to assess the level of knowledge and awareness about dyslexia among teachers of elementary school in Madinah city, Saudi Arabia, and to assess the knowledge by the socio-demographic characteristics of the studied teachers, and to determine their source of knowledge about dyslexia.

The results of the present study revealed that the level of good knowledge about dyslexia was 42.9% among the studied 380 elementary school teachers.

The literature about dyslexia presented studies with similar aims as in this study. Some of these studies highlighted the lack of knowledge of teachers on dyslexia. Typically, educators find it difficult to choose the main characteristics, classify, establish the causes and, mainly, explain how to identify students with dyslexia. In a study included 78 elementary school teachers administered a survey of language concepts on dyslexia showed a poor level of knowledge among [27]. In a study of the knowledge of dyslexia in one hundred teachers in the US and seventy teachers in the UK, the teachers displayed the same common misunderstandings [28].

Most studies published deal with the teachers knowledge of concepts of language and their understanding of orthography, there is not much scientific literature on the teachers ability to identify dyslexia

In contrast to these studies, other studies have reported Four hundred and eighty student teachers were surveyed regarding their knowledge and attitude towards dyslexia. The teachers demonstrated good knowledge and strongly positive attitude towards dyslexia and a majority expressed confidence in their ability to guide students with dyslexia [29]. In our study 43% of the teachers admitted to good level of knowledge and they knew correctly about the items concerning the concept and definition of dyslexia and this was evident in more than two-thirds of the studied teachers.

In the present study, the level of knowledge was varied according to the socio-demographic characteristics of the studied teachers, although not significant. Level of good knowledge was higher among teachers aged ≤ 40 years (44.6%), male teachers (43.6%), married (43.2%), having 1-3 children (44.5%), teachers having bachelor degree (43.8%). The highest percent of good knowledge was found among science and mathematics teachers 49.9%.

Also, similar results was obtained from a recent Saudi study by Alahmadi and El Keshky [30] in 2018 in Jeddah city. The study was conducted on a sample of 902 primary school teachers from 78 schools across different of Saudi Arabia. Teachers' knowledge about learning disabilities was surveyed electronically using a structured knowledge 40-item questionnaire on learning disabilities. The study found that a majority of primary school teachers have average

knowledge about specific learning disabilities. Consequently, teachers' range of knowledge has statistically significant impact on their level of knowledge. The study correspondingly shows a significant relationship between levels of knowledge and socio-demographic variables, but no statistically significant difference in the knowledge level of male and female teachers regarding learning disabilities [31].

Moothedath and Vranda [32] explored the knowledge of special learning disabilities among teachers at the primary level in Bangalore on a sample of 200 teachers. They found that there was a statistically significant relationship in overall level of knowledge and teacher gender, education, years of experience, type of school and class being taught.

A similar cross sectional study was conducted to investigate teacher perceptions about learning disabilities in the public schools of slum areas of Chandigarh, India. A purposive sampling technique was adopted to obtain a sample of 80 teachers from 103 schools there. A structured questionnaire was used to measure the teachers' perceptions regarding learning disabilities. It was found that 56.3% of them were aware of learning disabilities and approximately 68% of respondents believed that they did encounter such children in school [32].

In contrast to this and other mentioned studies results, however, A previous Saudi study conducted in Riyadh city to assess the awareness about dyslexia, included on 500 teachers of elementary public and private schools revealed that awareness and knowledge among elementary school teachers is fair to poor regarding the diagnostic symptoms of dyslexia [33]. That study showed also no statistically significant differences in knowledge level by the studied socio-demographic characteristics [33].

Also, in Kuwait, Aladwani and Al Shaye [34] carried out study to assess the awareness of teachers about early signs of dyslexia on 700 primary school teachers. The results showed lack of knowledge and a awareness of the early signs of dyslexia among the studied teachers. Only 6.9% having a high level of knowledge. Only 5% of the sample had read more than 4 times About dyslexia, (19.9 %) of the sample who never researched about dyslexia. In that study, both genders showed no statistical differences in their level of awareness [34]. Some studies have attributed teachers' age and their

teaching experience to have a positive correlation with knowledge and this is [35,36]. This perception is important, since the teacher in general is the first professional to confront the difficulties manifested by children with dyslexia during the initial period of literacy. Therefore, the initial years of schooling are crucial for an early identification of schoolchildren with dyslexia, and the teacher should be instrumental in helping them to advance in the process of learning to read and write. Specifically, the educator needs to identify such students, to refer, if necessary, to competent extracurricular services, and to promote an appropriate pedagogical intervention in the school environment [27].

In the present study, the educational degree has appeared to influence the level of knowledge about dyslexia among the studied teachers. Although not significant, the level of good knowledge was higher among teachers with bachelor degree. Similar to this finding, a Greek study has reported lack of good knowledge about dyslexia in under graduated teachers. Balasaki [35] in 2015, conducted a study in 181 primary school teachers using questionnaires, showed that almost half of the participants had only basic knowledge about dyslexia and those with postgraduate studies appeared to have greater knowledge compared to those with undergraduate degree. Also, the need for more training in dyslexia was reported by the majority of the participants .

Also, the present study findings indicate high mean knowledge scoring among the studied teachers accounting for 9.95 ± 1.9 which is fixed at 62% of the total mean scoring (scoring range from 1-16). The mean scoring was higher among teachers aged ≤ 40 years, teachers of science and mathematics, and those with work experience > 10 years. These findings are also in agreement with the results of Shari and Vranda [38] and Kakabarae et al. [39] that revealed the majority of teachers achieved a score higher than 10 for the learning disabilities studied items .

Similar to this and other studies results, the mean number of correct responses was 9.2 out of 14, in several studies [16-18].

Compared with similar studies, a high percent of teachers in this study knew correctly the exact nature of dyslexia and it is not a visual or auditory problem. The teachers knew that phonological deficit is the most agreed cause of dyslexia and the vast majority believed that

phonological awareness training is very effective, which contradicts Bell et al. [43] who found that very few teachers were aware of the phonological awareness as an underlying difficulty.

Also, in the present study most of the teachers knew that dyslexia co-occurs with other learning difficulties and the majority of the participants were aware of the associated working memory problems .

Studying the teachers' opinion while dealing with dyslexic child, 61.8% of teachers think to inform parents, 45.3% to inform academic advisor, 53.2% to refer the child to the early diagnosis center, and only 9.5% reported to do nothing. Also, the opinion of the studied teachers towards the need of them and other teachers of the elementary school to a workshop about the right way to deal with dyslexic child and the necessity to have a teacher's with special training for dyslexic children in the elementary school was high in all studied categories.

In accordance with the findings related to teachers' opinion about the importance of training on dyslexia mentioned above, other studies [37,43] have also showing that the more training the teachers have the greater their knowledge about dyslexia is .

It can therefore be assumed that training in dyslexia are of greatest importance for primary school teachers' effectiveness. Rose et al. [44] argued for more training of specialist teachers in order to support children with dyslexia in mainstream schools.

Also, the continuous professional development is needed to ensure that all staff have the appropriate skills to include and support children with dyslexia in mainstream classrooms. Similarly, Bos et al. [45] in their study found that teachers with more years of teaching experience had higher level of knowledge [35,36].

Ongoing education allows the educator to be updated, acquire new knowledge, deepen the knowledge on literacy, and perceive interdisciplinary and inclusion as fundamental principles of the educational process. The training should focus on class plans, didactic sequences, mapping the skills and competences of each student in order to outline strategies that allow learning. This will allow the teacher to think about the challenges of the literacy process [47].

A well-trained educator is able to early identify learning problems, considerably alleviate disorders resulting from dyslexia, provide an economy in expenses for families and for public education and health systems, and achieve the objectives of the school, that is, the full socio-cognitive development of the individual and its capacity for work and the exercise of citizenship [46,47].

In view of this, the educational institution must invest constantly in the formation of its pedagogical team through meetings, workshops, case studies, among others, in which different topics be debated addressing different teaching methodologies, enabling the improvement of teaching [40,41,42,47].

A report published by Zealand [48], in 2012, stated that professional development and education for teachers is promising as it enables them to understand whether their students have learning disabilities or not. Thus, in order to promote an early identification of dyslexia, the teacher needs to rely on such principles, working together with a multidisciplinary team of doctors, psychologists, speech therapists and psychopedagogues. The teacher provides the necessary support in the classroom, an environment in which the child is most requested to overcome his difficulties, reducing the consequences of the disorder on his overall development [35,36,47].

These findings and discussions all point to the importance of conducting an up-to-date study about the knowledge of specific learning disabilities among the primary school teachers in the KSA. If the special needs of children with learning disabilities are not attended to, it will result in scholastic backwardness and related psycho-social problems. Thus, early identification and intervention are very important. The ultimate focus of this study is to help teachers by developing a manual that could contribute to identifying children with learning disabilities.

The importance of the multidisciplinary team for the learning of children with dyslexia is undeniable, but in the Saudi educational reality, the absence of minimal teams with psychologists, speech therapists and psychopedagogues in schools is common. This certainly contributes to the lack of knowledge of some educators about dyslexia, and the source of knowledge among the majority of teachers included in this study was dependant on personal

acquisition (68.2%), while the special training courses among the studied teachers was presented only 13.2% in this study.

In contrast, developed countries, such as Singapore, Japan, Finland and Canada, have multidisciplinary teams in schools. They invest on public policies aimed to identify children with learning difficulties, and they also invest on teacher training. The results of such actions may be proven by international assessments, which pointed out these countries as superior when it comes to a high-quality education.

In the light of these issues, Saudi schools have to be prepared to cope with children with these disorders. According to the Saudi Ministry of Health (2012), there are around 720 000 children with disabilities in the Kingdom of Saudi Arabia from a Saudi population of 29 million, which means that 400 to 500 children are born with disabilities from the 400 000 to 500 000 births annually, with the common learning disabilities is dyslexia [49]. Based on these issues, there is a need for a greater investment in public policies able to accommodate and include all schoolchildren according to their specific needs.

According to available literature, this study is the first to assess knowledge and awareness of elementary school teachers on dyslexia in Madinah city. The present study findings will add to the Saudi literature concerning this important issue. Finally, the questionnaire used in data collection; including the questions of about dyslexia knowledge were structured and validated. Using validated tools are known to increase the confidence in obtaining sound and standard information.

The limitation of this study include that it is difficult to generalize about the study findings to all elementary school teachers in the Kingdom as this study was conducted on schools in only one city, Madinah. However, the main scope of this study was to renew Saudi literature about this important issue concerning dyslexia knowledge and awareness in a sample of Saudi elementary school teachers.

Finally, this study used self-report data to answer the research questions. This method is not always reliable because, as Cunningham et al. [49] argue, does not always represent the reality. Moreover, teachers may have felt vulnerable expressing their true knowledge and confidence levels about dyslexia, posing a potential threat to

the results. However, self-reporting in such types of studies is the most practical way to obtain information on such topic. Also, the use of structured valid questionnaire have facilitated the confidence in obtaining sound information in a standardized manner.

Future studies could explore in more depth teachers' knowledge of dyslexia using other sources of evidence like interviews, teachers' observations and data regarding pupils' progress.

Despite these limitations, the results of this study have shed more light on the current level of knowledge on dyslexia among elementary school teachers in Madinah city and addressed the need of educational program and training courses for teachers in elementary schools about dyslexia.

5. CONCLUSIONS AND RECOMMENDATIONS

The present study revealed that good level of knowledge on dyslexia among the studied elementary school teachers in Madinah City to account (42.9%). The results showed also that the majority of teachers to have positive opinion about the need of educational program and special training courses on dyslexia .

Although not significant, good level of knowledge on dyslexia was varied by the socio-demographic characteristics of the studied teachers. The higher level was among teachers aged ≤ 40 years, male teachers, married teachers, teachers having 1-3 children, teachers having bachelor degree. The highest percent of good knowledge was found among science and mathematics teachers.

This study is the first to assess knowledge and awareness of elementary school teachers in Madinah city. The study findings were in agreement with other similar studies, and the recent Saudi study conducted in Jeddah and published in 2019, which advocated that better teachers' knowledge on dyslexia was associated with age of teachers, educational degree, teacher's sex, marital status, and the teaching class.

The present study provides some important information about teachers' knowledge on dyslexia in elementary schools in Madinah City. Such information should help identify areas that need reinforcement or greater emphasis in the

health education and training programs provided to teachers in these schools all over the Kingdom. Finally, more studies are needed regarding this important issue. Such a study should be designed on a large national scale all over the Kingdom, and to explore in more depth teachers' knowledge of dyslexia.

CONSENT AND ETHICAL APPROVAL

- Approval for study was obtained from the Regional Research and ethics team at Medina
- Written consent was taken from participants.
- Confidentiality was assured during all stages of study.
- The participation is optional and not striking any sensitive information

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Aladwani AM, Al Shaye SS. Primary school teachers' knowledge and awareness of dyslexia in Kuwaiti students. *Education*. 2012;132(3):499-517.
2. Finn Jr CE, Manno BV, Vanourek G. *Charter schools in action: Renewing public education*: Princeton University Press; 2001.
3. Definition of Dyslexia international dyslexia association Available: <https://dyslexiaida.org/frequently-asked-questions-2/>
4. Ellis AW, McDougall SJ, Monk AF. Are dyslexics different? I. A comparison between dyslexics, reading age controls, poor readers and precocious readers. *Dyslexia*. 1996;2(1):31-58.
5. O'Hare A. Dyslexia: what do paediatricians need to know? *Paediatrics and Child Health*. 2010;20(7):338-43.
6. Rao S, Raj A, Ramanathan V, Sharma A, Dhar M, Thatkar PV, et al. Prevalence of dyslexia among school children in Mysore. *International Journal of Medical Science and Public Health*. 2017;6(1):1-6.
7. Roongpraiwan R, Ruangdaraganon N, Visudhiphan P, Santikul K. Prevalence and clinical characteristics of dyslexia in primary school students. *Journal of the Medical Association of Thailand*=

- Chotmaihet thangphaet. 2002;85:S1097-103.
8. Chan DW, Ho CSh, Tsang Sm, Lee Sh, Chung KK. Prevalence, gender ratio and gender differences in reading-related cognitive abilities among Chinese children with dyslexia in Hong Kong. *Educational Studies*. 2007;33(2):249-65.
 9. Saviour P, Ramachandra N. Modes of genetic transmission of dyslexia in South Indian families; 2005.
 10. Smith SD, Kimberling WJ, Pennington BF, Lubs HA. Specific reading disability: identification of an inherited form through linkage analysis. *Science*. 1983;219(4590):1345-7.
 11. Shaywitz SE, Shaywitz BA, Fletcher J, Escobar M. Prevalence of reading disability in boys and girls. *Journal of the American Medical Association*. 1990;264(8):1002-998.
 12. Pennington BF, Gilger JW. How is dyslexia transmitted. *Developmental dyslexia: Neural, cognitive, and genetic mechanisms*. 1996;41-61.
 13. Stevenson J, Graham P, Fredman G, Mcloughli V. A twin study of genetic influences on reading and spelling ability and disability. *Journal of child psychology and psychiatry*. 1987;28(2):229-47.
 14. Wolff PH, Melngailis I. Family patterns of developmental dyslexia: Clinical findings. *American Journal of Medical Genetics Part A*. 1994;54(2):122-31.
 15. Hallgren B. Specific dyslexia ('congenital word-blindness'): a clinical and genetic study. *Acta Psychiatr Neurol Scand*. 1950;65:1-287.
 16. Singer E. The strategies adopted by Dutch children with dyslexia to maintain their self-esteem when teased at school. *Journal of learning disabilities*. 2005;38(5):411-23.
 17. Kavale KA, Forness SR. Social skill deficits and learning disabilities: A meta-analysis. *Journal of learning disabilities*. 1996;29(3):226-37.
 18. Maternal Stress and Coping Strategies in Developmental Dyslexia: An Italian Multicenter Study PubMed; 2017. Available:<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5743752/#B11>
 19. Wadlington EM, Wadlington PL. What educators really believe about dyslexia. *Reading Improvement*. 2005;42(1):16-33.
 20. Alhifthy EH, Solaim MN, AlJaidi HK, AlSaffar MS, AlHudaithi KA, AlGhamdi AA. Awareness of Riyadhs elementary school teachers about reading disability (dyslexia). *Current Pediatric Research*. 2017;21(4).
 21. Washburn EK, Joshi R, Binks-Cantrell ES. Teacher knowledge of basic language concepts and dyslexia. *Dyslexia*. 2011;17(2):165-83.
 22. Washburn EK, Binks-Cantrell ES, Joshi R. What do preservice teachers from the USA and the UK know about dyslexia? *Dyslexia*. 2014;20(1):1-18.
 23. Shetty A, Rai BS. Awareness and knowledge of dyslexia among elementary school teachers in India. *Journal Of Medical Science And Clinical Research*. 2014;2(5):1135-43.
 24. Thompson LS. *Dyslexia: An investigation of teacher awareness in mainstream high schools*; 2014.
 25. Knight C. What is dyslexia? An exploration of the relationship between teachers' understandings of dyslexia and their training experiences. *Dyslexia*. 2018;24(3):207-219.
 26. Silva C, Capellini SA. Efficacy of phonological intervention program in students at risk for dyslexia. *Rev. CEFAC*. 2015;17(6):1827-37 .
 27. Joshi RM, Binks E, Hougren M, Dahlgren ME, Ocker-Dean E, Smith DL. Why elementary teachers might be inadequately prepared to teach reading. *J Learn Disabil*. 2009;42:392-402.
 28. Washburn EK, Binks-Cantrell ES, Joshi RM. What Do Preservice Teachers from the USA and the UK Know about Dyslexia?. *Dyslexia*. 2014;20:1-18.
 29. Gwernan-Jones R, Burden RL. Are they just lazy? Student teachers' attitudes about dyslexia. *Dyslexia*. 2010;16:66-86.
 30. Alahmadi N, El Keshky M. Assessing Primary School Teachers' Knowledge of Specific Learning Disabilities in the Kingdom of Saudi Arabia. *Journal of Educational and Developmental Psychology*. 2019; 9:1.
 31. Moothedath S, Vranda, M N. Knowledge of primary school teachers in identifying children with learning disabilities. *Disability, CBR & Inclusive Development*. 2015;26(3):68-76.
 32. Padhy SK, Goel S, Das SS, Sarkar S, Sharma V, Panigrahi M. Prevalence and patterns of learning disabilities in school children. *The Indian Journal of Pediatrics* 2016; 83(4):300-306.

33. Alhifthy EH, Solaim MN, AlJaidi HK, AISaffar MS, AlHudaithi KA, AlGhamdi AA. Awareness of Riyadh elementary school teachers about reading disability (dyslexia). *Current Pediatric Research*. 2017;21(4):636-639.
34. Aladwani AM, Al Shaye SS. Primary school teachers' knowledge and awareness of dyslexia in Kuwaiti students. *Education*. 2012;132(3):499-517.
35. Spear-Swerling L, Brucker PO, Alfano MP. Teachers' literacy-related knowledge and self-perceptions in relation to preparation and experience. *Ann Dyslexia*. 2005;55:266-96.
36. Goldfus C. Knowledge foundations for beginning reading teachers in EFL. *Ann Dyslexia*. 2012;62:204-21.
37. Balasaki G. Exploring primary school teachers' knowledge about dyslexia and ADHD, 2015. University of Macedonia, Macedonia.
38. Shari M, Vranda MN. Attitude of primary school teachers towards children with learning disabilities *Journal of Indian Association of Child Adolescent Mental Health*. 2016;12(4):323-335.
39. Kakabaraee K, Arjmandnia AA, Afrooz G A. The study of awareness and capability of primary school teachers in identifying students with learning disability in the province of Kermanshah. *Procedia-Social and Behavioral Sciences*. 2012;46:2615-2619. Available:<https://doi.org/10.1016/j.sbspro.2012.05.534>
40. Wadlington EM, Wadlington PL. What educators really believe about dyslexia. *Reading Improvement* 2005;42(1):16.
41. Washburn EK, Binks Cantrell ES, Joshi R. What do preservice teachers from the USA and the UK know about dyslexia? *Dyslexia*. 2014;20(1):1-18.
42. Washburn E K, Joshi R, BinksCantrell E S. Teacher knowledge of basic language concepts and dyslexia. *Dyslexia*. 2011;17(2):165-183.
43. Bell S, McPhillips T, Doveston M. How do teachers in Ireland and England conceptualise dyslexia? *Journal of Research in Reading*. 2011;34(2):171-192.
44. Rose J. Identifying and Teaching Children and Young People with Dyslexia and Literacy Difficulties. London:DCSF; 2009.
45. Bos C, Mather N, Dickson S, Podhajski B, Chard D. Perceptions and knowledge of preservice and inservice educators about early reading instruction. *Annals of Dyslexia*. 2001;51(1):97-120.
46. Nascimento I, Rosal A, de Queiroga B. Elementary school teachers' knowledge on dyslexia. *Rev. CEFAC*. 2018;20:1. Available:<http://dx.doi.org/10.1590/1982-021620182019117>
47. Ministry of Education. Report of the Ministry of Education, New Zealand; 2012.
48. Ministry of Health: Health statistical year book (2012). Riyadh. Available:<https://www.moh.gov.sa/en/Ministry/Statistics/Pages/default.aspx>
49. Cunningham AE, Zibulsky J, Stanovich KE, Stanovich PJ. How teachers would spend their time teaching language arts: The mismatch between self reported and best practices. *Journal of Learning Disabilities*. 2009;42(5):418-430.

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