



The prevalence of dyslexia among school age Persian speaking students in Arak, Iran

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Abstract

Background: Dyslexia is the most common learning disorder. Early detection and early intervention is important for children with dyslexia. The aim of the present study is to investigate the prevalence of dyslexia in Arak, Iran.

Methods: It is a descriptive-analytic study conducted among 2135 male and female students in 6 grades and two educational districts in 2018. The screening Inventory Reading Test (IRT) was used to diagnosis dyslexia. It was conducted individually by an experienced speech and language pathologist.

Results: According to statistical analysis, prevalence of dyslexia is 9.1 percent in female and 10.6 percent in male students in Arak. The most prevalence was in 4th grade male students (21.5 percent) and the least one in 6th grade female students (1.4 percent). The prevalence of dyslexia in male students were higher than female students and it is statistically significant in 5th and 6th grades ($p=0.007$). There was no significant difference between two districts ($p=0.211$). The prevalence in 3th and 4th grades are significantly higher than other grades ($p<0.001$).

Conclusion: The prevalence of dyslexia in Arak is similar to the USA (9.9%). Our report about male students is similar to other cities in Iran. Differences about male students can be explained by different culture and the screening used tool. Additionally, gender is not an effective factor in dyslexia prevalence. Finally, the prevalence does not decrease by enhancing the grade.

Keywords: Prevalence, Dyslexia, Persian language, Arak

Conflicts of Interest: None declared

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Introduction

Reading disorder, as the most common learning disorder, includes disorders in acquisition of reading and writing in spite of having a natural mental ability. This disorder should not be caused by sensory, emotional, and excitement and economic conditions (1). This disorder is lifelong and intrinsic condition and modified by the instruction (2). Children with reading disorder often show some degree of damage in the comprehension and expression language (3).

As mentioned, reading disorder is one of the most common learning disabilities. The different prevalence is reported for this disorder. Some studies have reported the prevalence of this disorder 6 to 15 percent in Thai (4), and 13.6 percent in Mysore children (5). International Centre of Child Health Research (ICCHR) has conducted a study in children with specific health care needs in the United States and showed that 9.7% of these children have reading disorder (6). There

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↑What is “already known” in this topic:

The prevalence of reading disorder in the USA was 9.7 and in the city of Qom was 5.6 and in the city of Shahreza was 10.8 for second grade boys. Different methodologies revealed different results in this issue.

→What this article adds:

The prevalence of reading disorder was 9.9% for all students, 9.1%, in girls and 10.6% in boys. The highest prevalence was reported in the fourth grade, thus with the increase in grade, the prevalence of reading disorder did not decrease.

are reports of the prevalence of reading disorder in Iran. One of these surveys was conducted in Qom and 1562 primary school children were evaluated regardless of their educational grade. The results showed that 5.6% of these children had a reading disorder (7). Another survey in Ahvaz studied the prevalence of reading disorder again regardless of the educational grade and considering the overweight factor. The results of this study showed that the prevalence of reading disorder was 3.5% in healthy students and 21% in overweight students(8). Seagate and colleagues assessed the prevalence of reading disorder in 200 first to fifth grade students of primary school in Isfahan, and reported that the highest prevalence of reading disorder was among the first grade boys of primary school students (25%) and in fifth grade girls it was the lowest (zero percent)(9). The prevalence of reading disorder in Shahrekord showed that 10.5% of boys and 7.3% of girls and in the third grade of primary school, 8.4% of boys and 4.3% of girls had reading disorder. They also noted that there was a significant difference between the number of girls and boys with reading impairment, but no significant difference was found between the third and fourth grades (10). In another study conducted in Shahreza, the second to fifth grade children were evaluated and the highest prevalence was in the second grade boys (10.8%) and the lowest prevalence was in the fifth grade girls (2.8%). Also, the difference between male and female students in different educational grades was statistically significant (11). The studies reviewed have provided different methodologies and different results. On the other hand, differences in culture affect language and reading abilities (12). Therefore, it seems necessary to determine the prevalence of this disorder in other cities of Iran that have a different cultural context. Early detection of this disorder can help to early intervention and preventing the secondary problems of reading disorder such as academic failure. Therefore, we decided to study the prevalence of reading disorder among 1-6th grade students in Arak city and measure the effect of gender and educational grade on the prevalence of this disorder.

Methods

In this cross-sectional descriptive-analytic study, a total of 2135 students (1198 boys and 937 girls) were studied in Arak schools. This number was selected using multi-stage cluster sampling. For sample selection, at first in each of the two districts of Arak, all schools were chosen and then the number of samples per grade was divided into the number of schools that had that grade with that gender and district. Then, by using a simple random method, from the alphabetical list of students in each class the students were selected using a table of random number. According to the sample size formula, considering $\alpha=0.05$, $p=0.1$, $d=0.013$, the sample number is 2100. A total of 2135 people were enrolled in the study. The criteria for entering the study included: having natural intelligence, healthy or modified eyesight, normal hearing, no history of psychiatric and neurological disorders. These data were extracted from the students' medical records in the school. Exclusion criterion was the student's reluctance to continue the assessment.

Parents of all students signed a written ethical consent form. The evaluations were carried out six months after the start of the school year, so that students, especially the first-grade children, would be fluent in the taught books. All of these students were evaluated using Inventory Reading Test (IRT) (13). The assessment was conducted by a speech and language pathologist and individually. This tool for each academic grade included a 100-word text, and four comprehension questions. The subject was asked to read the text aloud and then answer questions about comprehension. If the subject correctly reads less than 90% of the words and his comprehension score is less than 50%, that is, he/she has more than 10 errors and answers less than 2 questions correctly, thus he/she is at the level of reading disorder or unable reading. If the subject correctly answers 98% of the words correctly and answers all questions of comprehension, he/she is at the independent reading. If it reads less than 98% of the words correctly and answers to three questions of comprehension correctly (comprehension is 75%), he/she is at the educable reading (13). Based on this, the participants were divided into three groups of independent reading, educable reading and unable reading. In the present study, the values of qualitative variables were represented as "(percent) frequency. Chi-Square test was used to determine the relationship between the prevalence of reading disorder and gender, educational grade and educational area. For these analyses, SPSS 16 software was used and $P<0.05$ was considered statistically significant.

Results

The participants' demographic information, based on their gender, academic grade and academic district are presented in Table 1, with the number and percentage being considered. The largest number of participants was from the first grade. The number of participants from both areas was almost equal. All of these participants were screened for reading. The number of participants in each level of education, including recall, training and flashing, that are divided according to the score obtained in the assessment, disaggregated by gender has shown in Figure 1. As you can see, 42.4% of the students belong to group of educable reading, 47.6% to group of independent reading and 9.9% to group of reading disorder. Then, the prevalence of reading disorder in students is 9.9%. The prevalence was 9.1% for girls and 10.6% for boys (Table 2). According to

Table 1. Participants' demographic characteristics

Gender	Number (Percent)
Boy	1198(56.1)
Girl	937(43.9)
Area	
1	1064(49.8)
2	1071(50.2)
Grade	
1	394(18.50)
2	346(16.2)
3	362(17.00)
4	374(17.50)
5	328(15.4)
6	330(15.50)

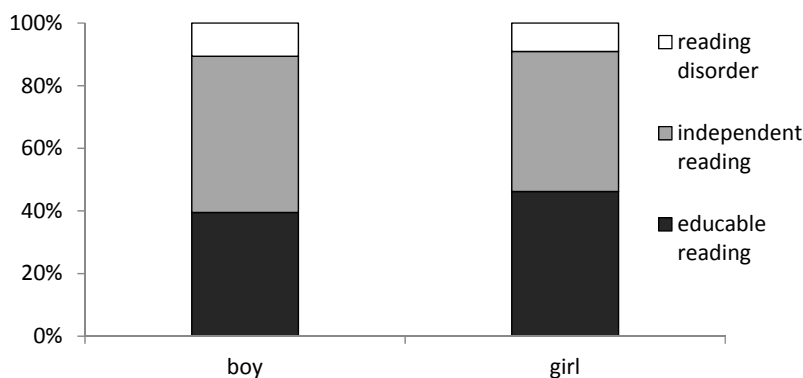


Fig. 1. Frequency distribution of reading disorder in male and female participants

the results of the Kayo test shown in the Table 3, the level of disorder in boys (10.6%) was significantly higher than girls (9.1%) ($p=0.007$). There was no significant difference between the prevalence of this disorder in district 1 (41.5%) and district 2 (43.3%) ($p=0.121$) and the degree of disorder in grades 3 and 4 was greater than grades 1, 2, 5 and 6 ($p<0.001$). The percentage of students with reading disorder in the first grade is 8.6%, in the second grade 4.0%, in the third grade 13.2%, in the fourth grade 20.3%, in the

fifth grade 8.2% and in the sixth grade 3.9 percent. The highest prevalence was in the fourth grade boys with 21.5% and the lowest prevalence was in sixth grade girls was 1.4%. In comparing girls and boys in different grades, the total reading disability was higher in boys than in girls and this increase was significant at the second and fifth grades ($p<0.001$).

Table 2. The relationship between the level of reading ability with gender, area and academic grade

	Level of reading ability			Chi-square statistics	P
	Independent reading	Educable reading	Unable reading		
Gender				$2_{x(2)} = 9.83$	0.007
Boy	473(39.5)	598(49.9)	127(10.6)		
Girl	433(46.2)	419(44.7)	85(9.1)	$2_{x(2)}=3.11$	0.211
Area					
1	442(41.5)	525(49.3)	98(9.1)	$2_{x(10)}=91.8$	<0.001
2	464(43.3)	492(45.9)	115(10.7)		
Academic Grade					
1	173(43.9)	187(47.5)	34(8.6)		
2	160(46.2)	172(49.7)	14(4.0)		
3	137(37.7)	178(49.0)	48(13.2)		
4	117(31.1)	181(48.4)	76(20.3)		
5	158(48.2)	143(43.6)	27(8.2)		
6	161(48.8)	156(47.3)	13(3.9)		

Values are represented as "(%) frequency".

Table 3. Comparison of girls and boys in terms of reading ability level by educational area and educational grades

	Chi-square statistics	Level of reading ability			Gender	P	
		Independent reading	Educable reading	Unable reading			
Educational area	1	$2_{x(2)}=1.22$	262(40.4)	329(50.7)	58(8.9)	Boy	0.542
			180(43.4)	196(47.2)	39(9.4)	Girl	
	2	$2_{x(2)}=12.03$	211(38.4)	269(49)	69(12.6)	Boy	0.002
			253(48.5)	223(42.7)	46(8.8)	Girl	
Educational grades	1	$2_{x(2)}=1.38$	95(42.6)	111(49.8)	17(7.6)	Boy	0.501
			78(45.6)	76(44.4)	17(9.9)	Girl	
	2	$2_{x(2)}=1.88$	88(43.8)	103(51.2)	10(5.0)	Boy	0.391
			72(49.7)	69(47.6)	4(2.8)	Girl	
	3	$2_{x(2)}=1.51$	71(35.5)	104(52)	25(12.50)	Boy	0.457
			66(40.5)	74(00.00)	23(14.1)	Girl	
	4	$2_{x(2)}=4.11$	50(26.2)	100(52.4)	41(21.5)	Boy	0.092
			67(36.6)	81(44.3)	35(19.1)	Girl	
	5	$2_{x(2)}=9.19$	86(43.9)	87(44.4)	23(11.7)	Boy	0.010
			72(54.5)	56(42.4)	4(3.0)	Girl	
	6	$2_{x(2)}=6.40$	83(44.4)	93(49.7)	11.5.9	Boy	0.041
			78(54.5)	63(44.1)	2(1.4)	Girl	

Values are represented as "(%) frequency".

Discussion

The main objective of this study was to determine the prevalence of dyslexia among students in Arak, in which 2135 students from the first to sixth grade were evaluated. The results of this study indicated that the prevalence of this disorder was 9.9% for all students. The prevalence of this disorder was higher in boys than in girls, although this difference was not statistically significant. The highest prevalence was reported in the fourth grade, thus with the increase in grade, the prevalence of reading disorder did not decrease. The prevalence of reading disorder in the city of Arak was 9.1%, in girls and 10.6% in boys.

In Iranian studies, this prevalence in boys is similar to reports from Shahrekord and Shahreza in Iran (10, 11), But for girls, the study has shown a higher prevalence. On the other hand, the findings from our study showed that the prevalence of reading disorder was higher than that reported by Ahwaz, which had raised 3.5 percent in students (7). This can be due to the different tools used in these studies. Our study tool is a screening tool that has a higher sensitivity than tool used by these two mentioned studies (14). It may be due to a higher sensitivity to show a higher prevalence for this disorder. In addition, cultural differences are also very influential in this regard (15). The results of this study showed that similar to all speech and language disorders, the prevalence of reading disorder in Arak was higher in boys than in girls. The difference in the prevalence of reading disorder between boys and girls was significant at the second and fifth grades. These results were similar to the results of Sharifi et al. that showed significant differences between girls and boys in some third and fourth graders and did not show significant difference in other grades (10). In the study of Rahimian et al., there was a significant difference between the two groups, which was not consistent with the results of the study (11).

In non-Iranian studies, the overall prevalence of reading disorder among students in the city of Arak was 9.9%; this finding is very close to the report of the United States Center for Children's Health Research, which reported 9.7 % (6). Therefore, in general, according to this survey, the prevalence of this disorder is not significantly affected by the gender variable. Although, there was no difference in the percentage of male and female disorder, but in general, girls were better than boys in recall and education groups.

Conclusion

Based on this study, the prevalence of reading disorder among first-sixth grade students in Arak city was 9.9% and in boys more than girls, although this difference was not statistically significant.

Additionally, the prevalence of reading disorder did not decrease with increasing academic grade.

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Conflict of Interests

The authors declare that they have no competing interests.

References

1. Reid G. Dyslexia: A practitioner's handbook: John Wiley & Sons; USA. 2016.
2. Mather N, Schneider D. The use of intelligence tests in the diagnosis of specific reading disability. Handbook of Intelligence: Springer; 2015. p. 415-33.
3. Horowitz-Kraus T, Schmitz R, Hutton JS, Schumacher J. How to create a successful reader? Milestones in reading development from birth to adolescence. *Acta Paediatrica*. 2017;106(4):534-44.
4. Roongpraiwan R, Ruangdaraganon N, Visudhiphan P, Santikul K. Prevalence and clinical characteristics of dyslexia in primary school students. *J Med Assoc Thai*. 2002;85:S1097-103.
5. Rao S, Raj A, Ramanathan V, Sharma A, Dhar M, Thatkar PV, et al. Prevalence of dyslexia among school children in Mysore. *Int J Med Sci Public Health*. 2017;6(1):159-64.
6. Altarac M, Saroha E. Lifetime prevalence of learning disability among US children. *Pediatrics*. 2007;119(Supplement 1):S77-S83.
7. Pouretamad HR, Khatibi A, Zarei M, Stein J. Manifestations of developmental dyslexia in monolingual Persian speaking students. *AIM*. 2011;14(4).
8. Hakim A, Ghorbanibirgani A. Prevalence of Dyslexia among Male Students in Primary Schools and Its Relationship with Obesity and Being Overweight in Ahvaz, Iran. *Int J Community Based Nurs Midwifery*. 2015;3(2):116.
9. Sedaghati L, Foroughi R, Shafiei B, Maracy MR. Prevalence of dyslexia in first to fifth grade elementary students Isfahan, Iran. *Audiology*. 2010;19(1):94-101.
10. Sharifi AA, Davari R. prevalence of reading disorder among primary school students in Shahrekord. *Journal of Exceptional Children*. 2009;8(4):413-8.
11. Rahimian Boogar E, Sadeghi A. Prevalence of reading disorder in primary school students. *IJPCP*. 2007;12(4):396-402.
12. Grainger P. The impact of cultural background on the choice of language learning strategies in the JFL context. *System*. 2012;40(4):483-93.
13. Shafiei B, et al. Developing a screening inventory reading test (IRT) for the Isfahanian students of the first to fifth grade. *Audiol*. 2009;17(2):53-60.
14. Maxim LD, Niebo R, Utell MJ. Screening tests: a review with examples. *Inhalation toxicology*. 2014;26(13):811-28.
15. Verpalen JM, van de Vijver FJ. Differences in neurocognitive aspects of dyslexia in Dutch and immigrant 6-7-and 8-9-years old children. *SpringerPlus*. 2015;4(1):105.

شیوع اختلال خواندن در دانش آموزان ابتدایی شهر اراک

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چکیده

هدف: اختلال خواندن، شایع‌ترین اختلال یادگیری است. تشخیص و درمان زود هنگام اختلال در کودکان دارای اختلال خواندن مهم است. هدف از این مطالعه بررسی شیوع اختلال خواندن در دانش آموزان ابتدایی در شهر اراک بود.

روش‌ها: پژوهش حاضر یک مطالعه مقطعی (توصیفی- تحلیلی) است که در ۲۱۳۵ دانش آموز دختر و پسر از شش پایه تحصیلی و در دو ناحیه تحصیلی شهر اراک در سال ۱۳۹۶ انجام شد. برای بررسی وجود اختلال خواندن از ابزار غربالگری تشخیص اختلال در خواندن استفاده گردید که بوسیله یک آسیب شناس گفتار و زبان با تجربه اجرا شد.

یافته‌ها: تحلیل آماری نشان دادند که شیوع اختلال خواندن در دانش آموزان شهر اراک در دختران ۹/۱ درصد و در پسران ۱۰/۶ است. بیشترین میزان شیوع در پسران پایه چهارم با ۲۱/۵ درصد و کمترین میزان شیوع در دختران پایه ششم با ۱/۴ درصد بود. میزان شیوع اختلال خواندن در پسران بیشتر از دختران بود و در پایه‌های پنجم و ششم معنادار بود. تفاوت آماری معنی‌داری بین میزان اختلال خواندن در ناحیه ۱ (۴۱/۵ درصد) و ناحیه ۲ (۴۳/۳ درصد) یافت نشد و میزان این اختلال در پایه‌های ۳ و ۴ بیشتر از پایه‌های ۱، ۲، ۵ و ۶ بود.

نتیجه گیری: شیوع اختلال در خواندن شهر اراک مشابه گزارشات ایالات متحده بود، در مورد پسران نیز مشابه شیوع در شهرهای دیگر ایران بود. در مورد پسران مطالعه حاضر شیوع بیشتری را نشان داد که ممکن است به علت استفاده از ابزار غربالگری و یا تفاوت فرهنگی باشد. علاوه بر این، براساس مطالعه حاضر متغیر جنسیت بر شیوع اختلال اثر معنادار نداشت و با افزایش پایه تحصیلی میزان شیوع اختلال کمتر نشده بود. شیوع اختلال خواندن در دانش آموزان پایه اول تا ششم شهر اراک، ۹/۹ درصد و در پسران بیشتر از دختران بود. به طور کلی سطح توانایی خواندن در دختران بالاتر از پسران بود.

کلیدواژه‌ها: شیوع، اختلال در خواندن، زبان فارسی، اراک

Conflicts of Interest: None declared

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