

Review Article



The Prevalence of Learning Disabilities among Elementary School Children in Iran from 1990 to 2025: Systematic Review and Meta-Analysis

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ABSTRACT

Introduction: Learning disabilities (LDs) are among the most common developmental and educational challenges faced by school-age children worldwide. This systematic review and meta-analysis aimed to provide a pooled estimate of the prevalence of all types of LDs in elementary school students in Iran.

Materials and Methods: A comprehensive systematic search was performed in international and national databases, including PubMed, Scopus, Web of Science, Google Scholar, Magiran, and SID, from January 1990 to March 2025. The quality of the articles was evaluated using the Joanna briggs institute (JBI). All analyses in this study were performed using the comprehensive meta-analysis (CMA) software, version 3.0.

Results: A total of 32 studies, comprising 81363 students, were included. The pooled prevalence of LDs among elementary school children in Iran was 5.6% (boys, 6.4%; girls, 5%). The prevalence of LDs in first-, second-, third-, fourth-, fifth-, and sixth-grade students was 9.5%, 6.9%, 6.2%, 5.2%, 4.5%, and 3.1%, respectively. The pooled prevalence of dyslexia, dyscalculia, and dysgraphia was 5.4%, 4.3%, and 3.4%, respectively.

Conclusion: This systematic review and meta-analysis reveal that at least one in 20 Iranian students has a learning disability, and this rate rises to one in ten in early grades.

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Introduction

Learning disabilities (LDs) are among the most prevalent developmental and educational challenges faced by school-aged children and adolescents worldwide. According to the American Psychiatric Association, learning disorders are neurodevelopmental conditions that impede the acquisition and application of academic skills, such as reading, writing, or arithmetic, despite adequate intelligence, appropriate schooling, and motivation [1, 2]. These disorders are persistent, heterogeneous, and typically diagnosed during the early years of formal education. The most commonly recognized types of LDs include dyslexia (reading disorder), dysgraphia (writing disorder), and dyscalculia (mathematical disorder) [3, 4]. These conditions profoundly affect academic performance and psychological well-being, self-esteem, and social participation [5].

The global prevalence of LDs varies widely, ranging from 5% to 15% of the student population, depending on diagnostic criteria, age groups studied, cultural and linguistic factors, and the tools used for screening and assessment [6, 7]. For instance, estimates tend to be more consistent in developed countries where standardized diagnostic protocols and inclusive education systems are well-established. However, in developing nations such as Iran, the identification and classification of LDs often face considerable challenges. These include limited access to trained specialists, variability in teacher awareness, lack of culturally adapted diagnostic tools, and regional disparities in educational infrastructure [8-11].

In recent years, Iran has witnessed an increasing interest in learning disorders, both at the research and policy levels. Numerous studies have sought to explore the prevalence of LDs among Iranian schoolchildren across various provinces [2, 12-14]. Nevertheless, the reported findings are highly inconsistent. Some studies suggest a prevalence of LDs of approximately 0.5% [15], while others report rates exceeding 20% [16] among elementary students. Also, the prevalence of various types of learning disorders has been reported to vary widely by gender, region, grade, and diagnostic approach [2, 17-20]. Similarly, estimates for dyslexia, dysgraphia, and dyscalculia show considerable variation, with some regions reporting alarmingly high rates, raising concerns about diagnostic accuracy and underreporting in other areas [16, 20-22].

Another major issue is the lack of a unified national protocol for LD screening in Iran. Most available data

are derived from cross-sectional studies with small, non-representative samples. Furthermore, many studies use teacher or parent reports, informal checklists, or non-standardized tests, which can introduce bias and undermine the reliability of prevalence estimates [23-26]. These methodological discrepancies make it difficult to draw definitive conclusions or develop coherent national strategies for early identification and intervention.

Given the significant educational, emotional, and social consequences of untreated LDs [5], an accurate estimate of their prevalence is vital for national planning, teacher training, and developing intervention programs. A comprehensive synthesis of available evidence can bridge the existing knowledge gap, guide resource allocation, and inform policy reforms aimed at inclusive education.

The present systematic review and meta-analysis were conducted to address these gaps by synthesizing the best available evidence on the prevalence of LDs and their major subtypes—dyslexia, dysgraphia, and dyscalculia—among Iranian elementary school students. By integrating data from multiple studies across the country, this review aimed to provide robust pooled estimates of prevalence and explore potential moderators, such as gender and educational level. Accordingly, the research question guiding this study is: What is the pooled prevalence of LDs and their major subtypes among Iranian elementary school students?

Materials and Methods

Study design

The entire protocol for this study was designed and conducted as a systematic review and meta-analysis in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement [27].

Search strategy

A comprehensive literature search was performed to identify all relevant studies reporting the prevalence of LDs and their subtypes in Iran. The following international and national electronic databases were systematically searched on March 18, 2025: [PubMed](#), [Scopus](#), [Web of Science](#), [Google Scholar](#), [Scientific Information Database \(SID\)](#), and [Magiran](#). The search included articles published from January 1990 to March 2025.

The search terms were developed based on [medical subject headings \(MeSH\)](#) and relevant keywords, including:

“(learning disabilities” OR “learning disability” OR “learning disorders” OR “specific learning disorders” OR “dyslexia” OR “dysgraphia” OR “dyscalculia” OR “math disorder” OR “math disability” OR “mathematical disorder” OR “mathematical disability” OR “reading disorder” OR “reading disability” OR “writing disorder” OR “writing disability”) AND (“prevalence” OR “incidence” OR “frequency” OR “epidemiology” OR “epidemiologic”) AND (“Iran” OR “Persian” OR “Farsi”)). We used Persian equivalent terms to search the national databases. In addition, the reference lists of all included studies and relevant reviews were manually screened to identify additional eligible studies.

Eligibility criteria

Studies were included if they met the following criteria: 1) population: Iranian students at any educational level (elementary grades), 2) outcomes: Reporting the prevalence of LDs or their specific subtypes (dyslexia, dysgraphia, dyscalculia), 3) language: Articles published in English or Persian, 4) accessibility: The full text of the article was available.

The exclusion criteria included reviews, case reports, editorials, and conference papers. Studies conducted outside Iran. Studies without clear diagnostic criteria or insufficient prevalence data. Gray literature (thesis, reports) was excluded. Studies that did not specify the grade of education or the gender of students were excluded.

Study selection

All identified records were imported into EndNote software, version X9 software, and duplicates were removed. In addition, the reference lists of all included articles were manually reviewed to identify any further relevant studies. Two independent reviewers (Alireza Aghaz and Aynaz Holakouee) screened the titles and abstracts for eligibility. Full texts of potentially relevant articles were retrieved and assessed independently by both reviewers. Disagreements were resolved through discussion.

Data extraction

A standardized data extraction form was developed for this study. The following information was extracted from each included study: first author's name, year of publication, study location (province/city), sample size, participants' educational level, type of learning disability assessed, diagnostic tools, and reported prevalence rates. Data extraction was performed independently by two reviewers. All studies were included regardless of prevalence.

Quality assessment

The methodological quality of the included studies was assessed using a modified version of the Joanna Briggs Institute (JBI) critical appraisal checklist for Prevalence Studies [28]. This checklist evaluates potential sources of bias related to sample selection, outcome measurement, and statistical analysis. The methodological quality of the included studies was assessed as percentages using the JBI criteria. The JBI critical appraisal checklist items are as follows:

1) Was the sample frame appropriate for the target population? 2) were the study participants sampled appropriately? 3) was the sample size adequate? 4) were the study subjects and setting described in detail? 5) was the data analysis conducted with sufficient coverage of the identified samples? 6) were valid methods used to identify the condition? 7) was the condition measured in a standard, reliable way for all participants? 8) was appropriate statistical analysis conducted? 9) was the response rate adequate? If not, was the low response rate managed appropriately?

Data analysis

A meta-analysis was performed using the comprehensive meta-analysis (CMA) software, version 3.0. The effect size in this study was calculated based on the event outcome and the sample size. Pooled prevalence rates with 95% confidence intervals (CIs) were calculated using a random-effects model due to expected heterogeneity between studies. Statistical heterogeneity was assessed using the I^2 statistic and Cochran's Q test. Subgroup analyses were conducted based on gender, educational level (first–sixth grade), and type of learning disability to explore potential sources of heterogeneity. Publication bias was evaluated using Egger's test and funnel plot symmetry.

Results

Study selection

A total of 5830 records were initially identified through database searching, of which 5494 were duplicates. After removing duplicates, 366 articles remained for title screening. After title screening, 158 articles remained for abstract screening. Based on inclusion and exclusion criteria, 51 full-text articles were assessed for eligibility. Finally, 32 studies were included in the systematic review and meta-analysis. The study selection process is illustrated in the PRISMA flow diagram (Figure 1).

Methodological quality of included studies

Table 1 presents the methodological quality of the reviewed studies based on the JBI. Based on the percentage scoring in Table 1, the mean score of the articles reviewed in this study was 91.5% (Table 1). The design of all reviewed studies was cross-sectional.

Based on the scores in Table 1, most JBI items (five items) received full scores across all reviewed studies. In this study, to obtain an accurate estimate of prevalence, we assigned negative scores to studies with sample sizes of fewer than 300 students on item 3 of the JBI. The lowest score among the articles reviewed in this study was for the validity and reliability of the instruments used. Because most Iranian studies do not comply with copy-

right laws, some studies had to use researcher-made instruments, which reduced the scores of these articles.

Characteristics of included studies

The 32 included studies were conducted across various provinces of Iran, covering both urban and rural areas. In this study, we had data from 19 provinces (61%) of Iran, which in detail are: from the provinces of Ahvaz, Qom, Chaharmahal and Bakhtiari, and Alborz, we had 3 articles each, from Tehran, Ardabil, Isfahan, Markazi, and Kerman, we had 2 articles each, and from the other provinces, we had 1 article each West Azerbaijan, Shiraz, Zanzan, Gilan, South Khorasan, Hamedan, North Khorasan, Semnan, Razavi Khorasan, Ilam.

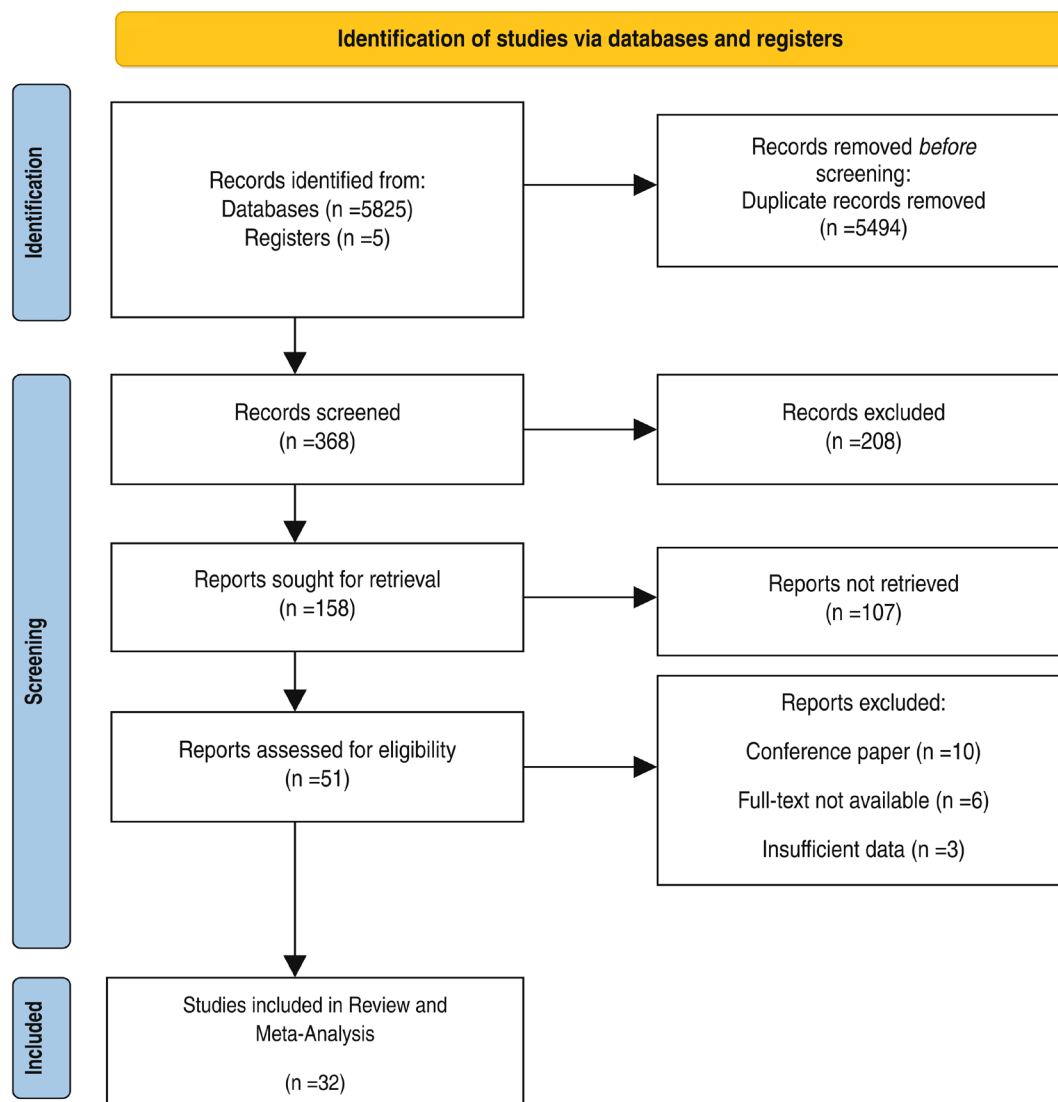


Figure 1. PRISMA flow diagram illustrating the study selection process for the meta-analysis

Table 1. Methodological quality of studies based on the JBI

Study	1	2	3	4	5	6	7	8	9	Total Score (%)
Pashapour et al. [25]	+	+	+	+	+	-	-	+	+	78
Ramezani [22]	+	+	+	+	+	+	+	+	+	100
Shah-Bodaghi [23]	+	+	+	+	+	-	-	+	+	78
Shehni Yailagh et al. [29]	+	+	+	+	+	+	+	+	+	100
Narimani et al. [30]	+	+	+	+	+	+	+	+	+	100
Rahimian et al. [31]	+	+	+	+	+	+	+	+	+	100
Barahmand et al. [32]	+	+	+	+	+	+	+	+	+	100
Mohammadyfar et al. [33]	+	+	+	+	+	+	+	+	+	100
Sharifi et al. [34]	+	+	+	+	+	+	+	+	+	100
Sedaghati et al. [21]	+	+	-	+	+	+	+	+	+	88
Hosseinaee et al. [18]	+	+	+	+	+	+	+	+	+	100
Sheghaghi [35]	+	+	-	-	+	+	+	+	+	78
Pouretamad et al. [24]	+	+	+	+	+	+	+	+	+	100
Mihandoost [26]	+	+	+	+	+	+	+	+	+	100
Alipoor et al. [12]	+	+	+	-	+	+	+	+	+	88
Sharifi et al. [36]	+	+	+	+	+	+	+	+	+	100
Talepasand et al. [15]	+	+	+	+	+	+	+	+	+	100
Nojabaee et al. [37]	+	+	+	+	+	-	-	+	+	78
Abtahi [16]	+	+	-	+	+	-	-	+	+	67
Khodadadi et al. [17]	+	+	+	-	+	-	+	+	+	78
Eslami et al. [20]	+	+	+	+	+	+	+	+	+	100
Ghorbanibirgani [38]	+	+	+	+	+	+	+	+	+	100
Zare Bahramabadi et al. [39]	+	+	+	+	+	+	+	+	+	100
Moinalghorabaie et al. [40]	+	+	+	+	+	+	+	+	+	100
Hakim et al. [41]	+	+	+	+	+	+	+	+	+	100
Ameri et al. [13]	+	+	+	+	+	-	-	+	+	78
Yavari et al. [42]	+	+	+	+	+	-	-	+	+	78
Echreshavi et al. [14]	+	+	+	+	+	+	+	+	+	100
Pourmohamadrezatajrishi et al. [43]	+	+	-	+	+	+	+	+	+	88
Yousefi et al. [44]	+	+	+	+	+	+	+	+	+	100
Ansari et al. [45]	+	+	-	-	+	+	+	+	+	78
Gholamiyan et al. [19]	+	+	+	+	+	-	-	+	+	78
Total (%)	100	100	84.4	87.5	100	75	78	100	100	91.5

The publication years ranged from 2000 to 2022, with sample sizes ranging from 123 to 34961 participants. All studies were conducted on elementary school students. Different diagnostic tools were used, including standardized tests, teacher reports, and clinical assessments. No studies with a prevalence above 30% were identified. One study reported a prevalence of 20%, but its contribution to the pooled estimate was small because of its limited sample size. Table 2 presents a detailed summary of study characteristics.

Pooled prevalence of learning disabilities

The prevalence of LDs was analyzed across 29 reviewed articles involving 77951 elementary school students, of whom 51.6% (40224 students) were male and 48.4% (37695 students) were female. The pooled prevalence of LDs among Iranian elementary school students was estimated at 5.6% (95% CI, 4.5%, 7.1%) using a random-effects model due to significant heterogeneity across studies ($I^2=95.8\%$, $P<0.001$) (Figure 2). The prevalence of learning disorders among boys and girls elementary school students was 6.4% (95% CI, 4.6%, 8.7%) and 5% (95% CI, 3.6%, 6.9%), respectively.

To calculate the prevalence of learning disorders in different grades, the results of 27 articles (71791 elementary school students) were reviewed, with the number of students in the first, second, third, fourth, fifth, and sixth grades being 3412, 14588, 16665, 18036, 17471, and 731, respectively. The overall pooled prevalence of LDs among Iranian elementary school students was estimated at 9.5% in first grade, 6.9% in second grade, 6.2% in third grade, 5.2% in fourth grade, 4.5% in fifth grade, and 3.1% in sixth grade (Table 3).

Pooled prevalence of dyslexia (reading disorder)

The prevalence of dyslexia was analyzed across 20 reviewed articles on 62445 elementary school students, of whom 52% (32463 students) were male, and 48% (29949 students) were female. The pooled prevalence of dyslexia among Iranian elementary school students was estimated at 5.4% (95% CI, 3.9%, 7.3%) using a random-effects model due to significant heterogeneity across studies ($I^2=98.09\%$, $P<0.001$). The prevalence of reading disorder among boys and girls in elementary school was 6.6% (95% CI, 3.9%, 7.3%) and 4.3% (95% CI, 2.7%, 6.7%), respectively (Figure 3).

To calculate the prevalence of reading disorders across different grades, results from 18 articles (61165 elementary school students) were reviewed, with the numbers

of students in first, second, third, fourth, and fifth grades being 3412, 13198, 15551, 13746, and 13844, respectively. The pooled prevalence of dyslexia among Iranian elementary school students was estimated at 9.7% in first grade, 7.5% in second grade, 5.7% in third grade, 4.7% in fourth grade, and 3.8% in fifth grade (Table 3).

Pooled prevalence of dysgraphia (writing disorder)

The prevalence of dysgraphia was analyzed across 8 reviewed articles on 51334 elementary school students, of whom 50.2% (25788 students) were male, and 49.8% (25547 students) were female. The pooled prevalence of dysgraphia among Iranian elementary school students was estimated at 3.4% (95% CI, 2.4%, 4.7%) using a random-effects model due to significant heterogeneity across studies ($I^2=87.4\%$, $P<0.001$). The prevalence of writing disorder among boys and girls in elementary school was 3.7% (95% CI, 2.3%, 6.1%) and 3% (95% CI, 1.9%, 4.8%), respectively (Figure 4).

To calculate the prevalence of writing disorders across different grades, results from seven articles (47334 elementary school students) were reviewed, with the numbers of students in first, second, third, fourth, and fifth grades of 1250, 10425, 11101, 11915, and 12238, respectively. The pooled prevalence of dysgraphia among Iranian elementary school students was estimated at 2.4% in first grade, 3.3% in second grade, 3.4% in third grade, 4% in fourth grade, and 1.9% in fifth grade (Table 3).

Pooled prevalence of dyscalculia (mathematics disorder)

The prevalence of dyscalculia was analyzed across 14 reviewed articles on 55768 elementary school students, of whom 50.4% (27958 students) were male, and 49.6% (27810 students) were female. The pooled prevalence of dyscalculia among Iranian elementary school students was estimated at 4.3% (95% CI, 3.2%, 5.7%) using a random-effects model due to significant heterogeneity across studies ($I^2=95.7\%$, $P<0.001$). The prevalence rates of mathematics among boys and girls in elementary school were 4.2% (95% CI, 2.8%, 6.3%) and 4.3% (95% CI, 2.8%, 6.5%), respectively (Figures 5 and 6).

To calculate the prevalence of mathematics disorders across different grades, results from 11 articles (51998 elementary school students) were reviewed, with the numbers of students in first, second, third, fourth, and fifth grades being 1250, 11815, 10479, 14191, and 13857, respectively. The pooled prevalence of dyscalculia among Iranian elementary school students was esti-

Meta Analysis

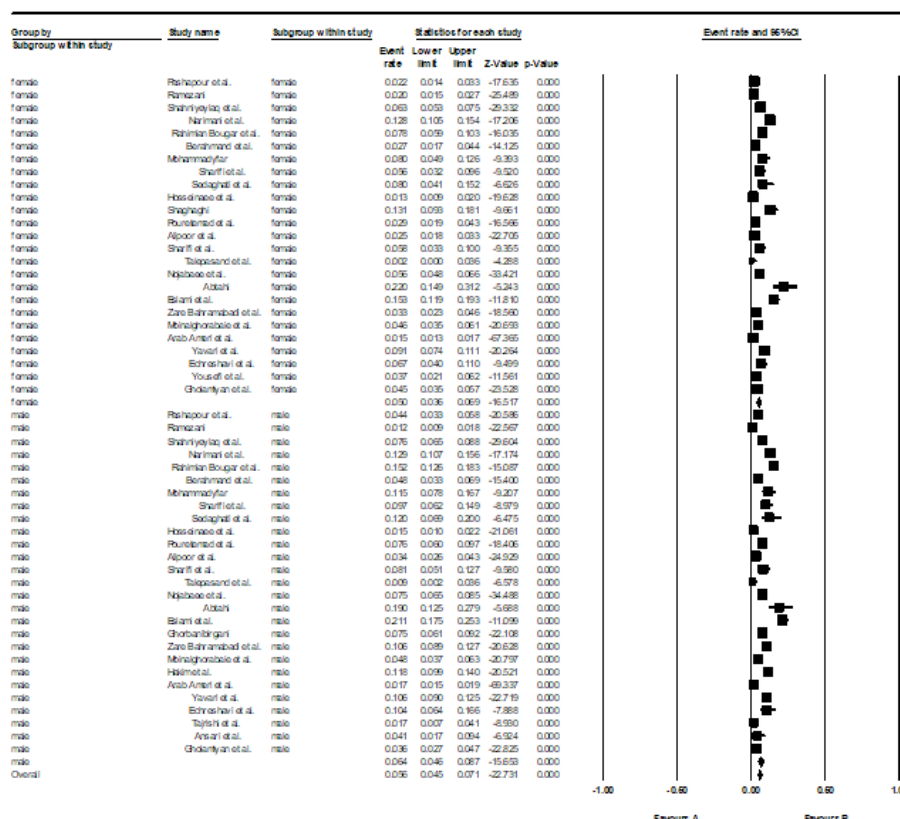


Figure 2. The prevalence of learning disabilities in Iranian elementary students

JMR

mated to be 2.5% in first grade, 4.2% in second grade, 4.9% in third grade, 3.4% in fourth grade, and 3.7% in fifth grade (Table 3 and Figure 7).

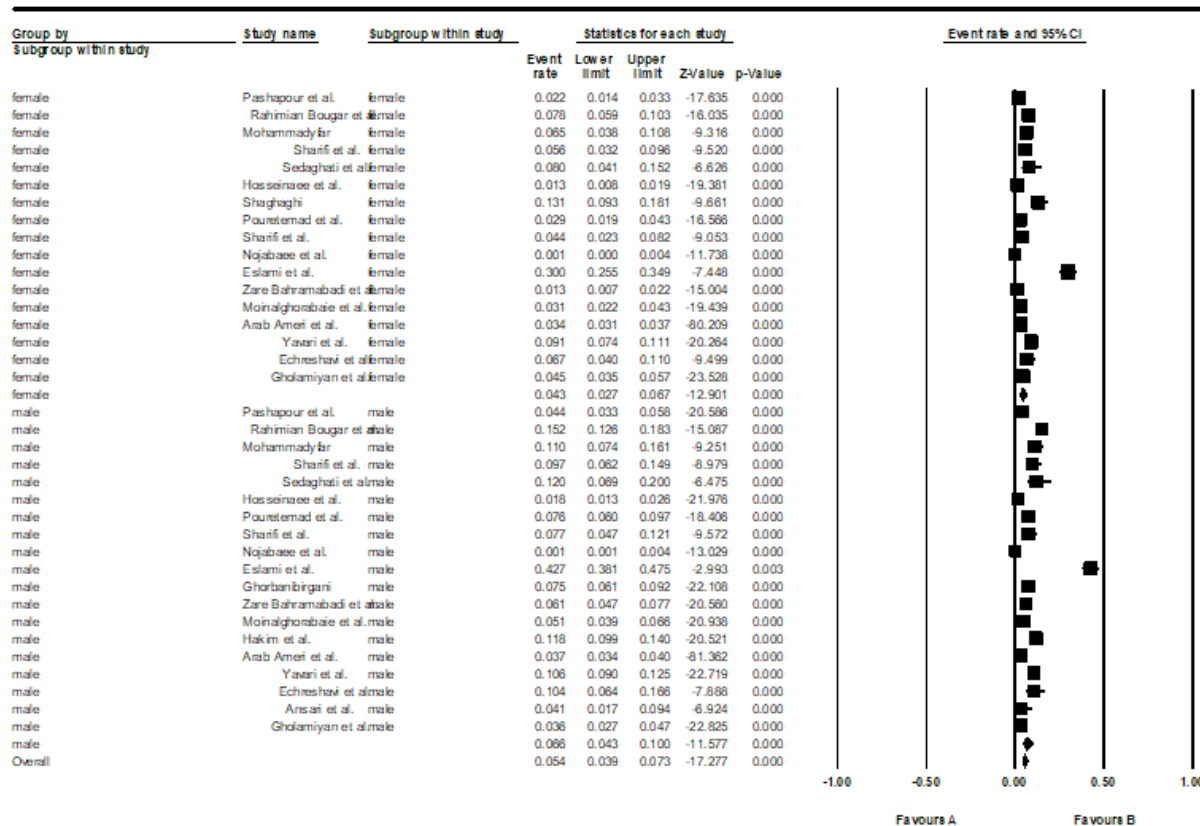
There was considerable heterogeneity observed within each subtype analysis ($I^2 > 80\%$, $P < 0.001$). Heterogeneity across studies was quantified using Cochran's Q-test and I^2 statistics. Subgroup analyses showed different prevalence rates according to grade level and gender, suggesting that part of the observed heterogeneity is attributable to these factors. Although meta-regression was not performed due to limited data, potential sources of heterogeneity are discussed, including variations in diagnostic instruments, study settings, population characteristics, and regional differences.

Egger's regression test was used to assess publication bias, and the results indicated significant publication bias ($P = 0.03$). However, no publication bias correction method (e.g. trim-and-fill) was applied, which may affect the interpretation of the pooled estimate.

Discussion

This systematic review and meta-analysis estimated the overall and subtype-specific prevalence of LDs among Iranian elementary school students from 1990 to July 2025. Based on pooled data from 32 eligible studies, the overall prevalence of LDs in Iran was 5.6%, which is comparable to Turkey (5.7%) [46], lower than India (10.7%) and Brazil (7.6%), and higher than Spain (3.2%) [47, 48]. These variations likely reflect differences in methodological approaches, diagnostic criteria, socio-demographic factors, and educational systems across countries.

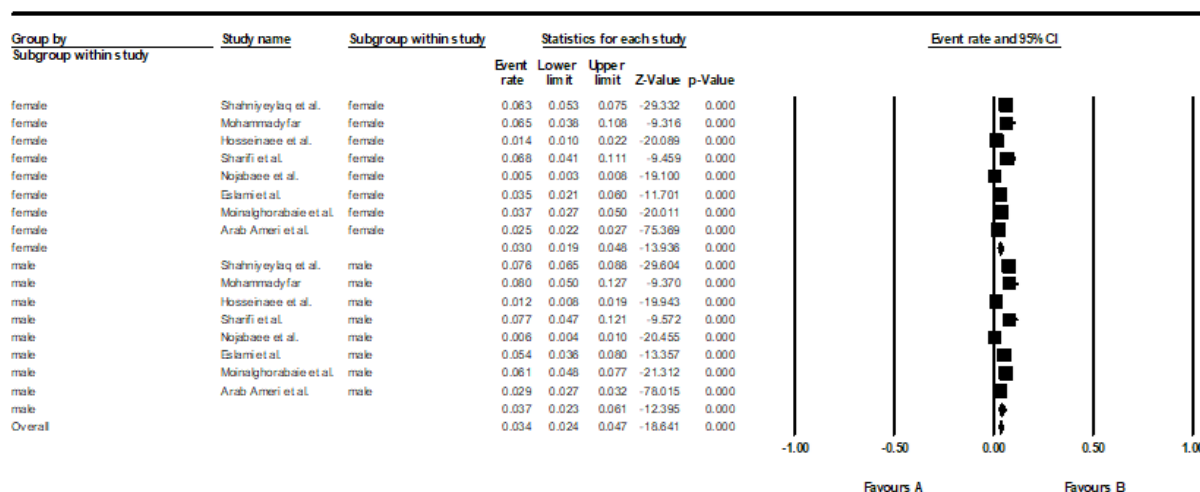
Subtype-specific analyses showed that dyslexia (5.4%) aligns with findings from China (5.4%) [49] and a prior Iranian study (5.7%) [8], but is lower than India (6.2%) [47], China (7.1%) [50], Brazil (7.5%) [51], and Arab countries (11%) [52], and higher than France (3.5%) [53] and China (3.9%) [54]. Dyscalculia (4.3%) was broadly consistent with India (4.9%) [47], higher than Malaysia (3.4%) [55], and lower than the UK (5.7%) [56] and China (8.9%) [57]. Dysgraphia (3.4%) was lower than India (6.3%) [47], Iraq (27%) [58], Brazil (22%) [59],



Meta Analysis

Figure 3. The prevalence of dyslexia in Iranian elementary students

JMR

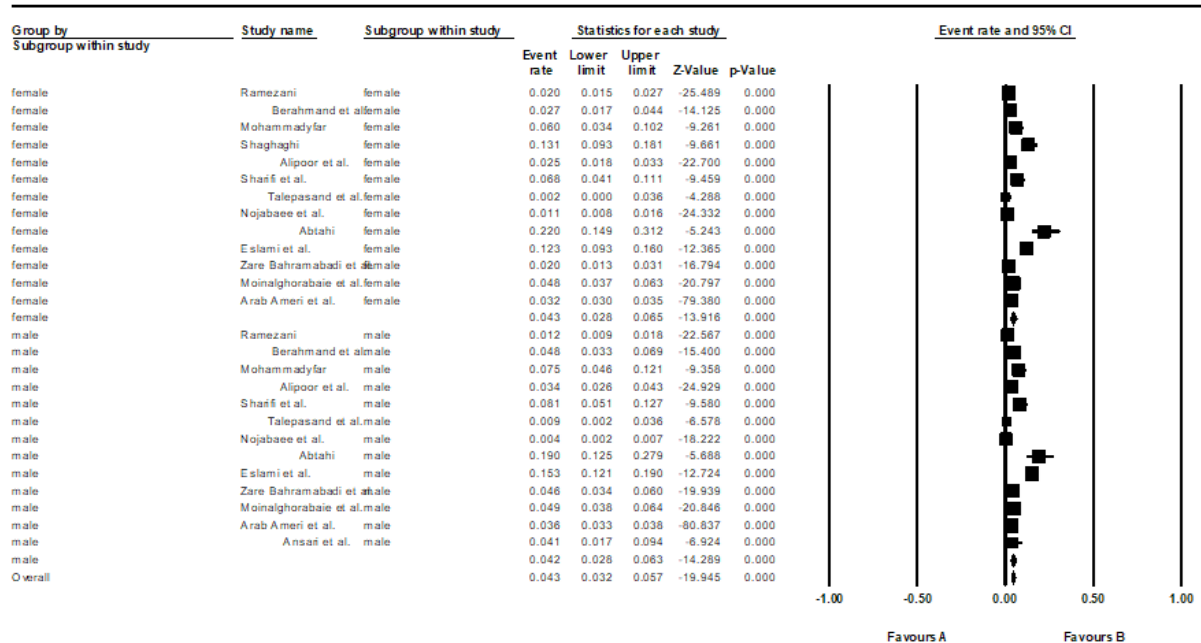


Meta Analysis

Figure 4. The prevalence of dysgraphia in Iranian elementary students

JMR

Meta Analysis



Meta Analysis

Figure 5. The prevalence of dyscalculia in Iranian elementary students

JMR

and Pakistan (48%) [60]. Differences in diagnostic criteria, methodological approaches, and study populations likely drive these discrepancies. The limited number of studies in Iran and the use of non-standardized tools may also contribute to lower prevalence estimates. For instance, in France, using the diagnostic and statistical manual of mental disorders, fifth edition, versus the international classification of diseases, 11th revision, criteria in the same population yielded prevalence rates of 6.6% and 3.5%, respectively [53].

This meta-analysis also revealed a higher prevalence of LDs in boys than in girls, consistent with international studies [47, 49, 52, 55, 57]. Gender differences may result from biological factors—such as increased male susceptibility to adverse prenatal and perinatal influences—and sociocultural and educational factors, including classroom behaviors, referral patterns, and cultural expectations [46, 47, 61, 62]. Early-life risk factors, including preterm birth, cesarean delivery, low birth weight, delayed developmental milestones, and comorbid conditions (e.g. autism, attention-deficit/hyperactivity disorder, cerebral palsy, epilepsy), were more frequently reported in boys [47, 48, 61-65].

A unique aspect of this study is the analysis of LD prevalence across grades one to six. Dyslexia prevalence was consistently higher than other LD subtypes, likely reflecting the availability of validated diagnostic tools and the limited number of studies on math and writing disorders in Iran [20, 33]. Moreover, both overall LD prevalence and dyslexia prevalence declined with advancing grade level, consistent with findings from China [57] and previous Iranian studies [8].

These findings highlight the need for strengthened educational and screening infrastructure in Iran, particularly when compared to other Middle Eastern or developing countries. Standardized national screening programs and diagnostic protocols are essential for early identification. Teacher training and public awareness campaigns are critical to reduce stigma and ensure timely referral of at-risk students. Special attention should be given to rural and underserved areas, where students may face a higher risk of undetected LDs.

Table 2. Characteristics of included studies

Study	Location and Date	Grade	Sample Size (n)	Sex (Male)	Diagnostic Method	Prevalence of Math Disorder (%)	Prevalence of Reading Disorder (%)	Prevalence of Writing Disorder (%)	Prevalence of Learning Disorder (%)
Pashapour et al. [25]	Urmieh 2000	3 rd	2067	1061	RLDT	-	Total: 3.33 Boy: 4.43 Girl: 2.18	-	Total: 3.33 Boy: 4.43 Girl: 2.18
Ramezani [22]	Tehran 2002	4 th 5 th	4341	2162	WISC IKMT DSMIV	Total: 1.63 4 th : 1.47 5 th : 1.77 Boy: 1.24 Girl: 2.01	-	-	Total: 1.63 4 th : 1.47 5 th : 1.77 Boy: 1.24 Girl: 2.01
Shah-Bodaghi [23]	Tehran 2002	1 st 2 nd 3 rd 4 th 5 th	1010	Nr	Texts of educational books	-	Total: 1.58 1 st : 2.75 2 nd : 1.01 3 rd : 1.03 4 th : 0.99 5 th : 2.01	-	Total: 1.58 1 st : 2.75 2 nd : 1.01 3 rd : 1.03 4 th : 0.99 5 th : 2.01
Shehni Yallagh et al. [29]	Ahvaz 2002	3 rd 4 th	4000	2000	RPM spelling test	-	-	Total: 6.95 Boy: 7.6 Girl: 6.3	Total: 6.95 Boy: 7.6 Girl: 6.3
Narimani et al. [30]	Ardabil 2005	3 rd 4 th 5 th	1440	720	WISC WADT MFT researcher-made tests	-	-	-	Total: 13 3 rd : 13 4 th : 12.05 5 th : 15.15 Boy: 13 Girl: 12.8
Rahimian Bougar et al. [31]	Shahreza 2007	2 nd 3 rd 4 th 5 th	1184	598	WISC RLDT	-	Total: 11.57 2 nd : 19 3 rd : 7.66 4 th : 7.16 5 th : 7.9 Boy: 15.21 Girl: 7.84	-	Total: 11.57 2 nd : 19 3 rd : 7.66 4 th : 7.16 5 th : 7.9 Boy: 15.21 Girl: 7.84
Barahmand et al. [32]	Ardabil 2007	2 nd 3 rd 4 th 5 th	1171	581	Standardized set of math of Shalev	Total: 3.76 2 nd : 2.77 3 rd : 4.14 4 th : 3.65 5 th : 4.17 Boy: 4.82 Girl: 2.71	-	-	Total: 3.76 2 nd : 2.77 3 rd : 4.14 4 th : 3.65 5 th : 4.17 Boy: 4.82 Girl: 2.71
Mohammadyfar et al. [33]	Shiraz 2007	3 rd 4 th	401	200	MRS Mik-Bass learning disability checklist researcher-made tests	Total: 6.7 3 rd : 5.1 4 th : 8.3 Boy: 7.5 Girl: 5.5	Total: 8.7 3 rd : 7.6 4 th : 9.8 Boy: 11 Girl: 6.5	Total: 7.2 3 rd : 5.6 4 th : 8.8 Boy: 8 Girl: 6.5	Total: 9.7 3 rd : 7.6 4 th : 11.8 Boy: 11.5 Girl: 8

Study	Location and Date	Grade	Sample Size (n)	Sex (Male)	Diagnostic Method	Prevalence of Math Disorder (%)	Prevalence of Reading Disorder (%)	Prevalence of Writing Disorder (%)	Prevalence of Learning Disorder (%)
Sharifi et al. [34]	Shahrekord 2009	3 rd 4 th	400	185	RLDT	-	Total: 7.5 3 rd : 6.03 4 th : 8.95 Boy: 9.72 Girl: 5.58	-	Total: 7.5 3 rd : 6.03 4 th : 8.95 Boy: 9.72 Girl: 5.58
Sedaghati et al. [21]	Isfahan 2010	1 st 2 nd 3 rd 4 th 5 th	200	100	SRIT	-	Total: 10 1 st : 20 2 nd : 12.5 3 rd : 7.5 4 th : 7.5 5 th : 2.5 Boy: 12 Girl: 8	-	Total: 10 1 st : 20 2 nd : 12.5 3 rd : 7.5 4 th : 7.5 5 th : 2.5 Boy: 12 Girl: 8
Hosseinaee et al. [18]	Qom 2011	3 rd 4 th 5 th	3282	1696	RPM learning disabilities symptoms checklist	-	Total: 1.55 3 rd : 1.88 4 th : 2.2 5 th : 0.84 Boy: 1.82 Girl: 1.26	Total: 1.34 3 rd : 1.79 4 th : 1.62 5 th : 0.84 Boy: 1.23 Girl: 1.44	Total: 1.44 3 rd : 1.83 4 th : 1.91 5 th : 0.84 Boy: 1.52 Girl: 1.35
Shaghghi [35]	Khorram-darreh 2011	2 nd 3 rd	229	0	CLDQ	Total: 13.1	Total: 13.1	-	Total: 13.1
Pouretmad et al. [24]	Qom 2011	1 st 2 nd 3 rd 4 th 5 th	1562	773	Analysis of Persian reading ability	-	Total: 5.24 1 st : 3.69 2 nd : 3.32 3 rd : 7.11 4 th : 6.06 5 th : 5.64 Boy: 7.63 Girl: 2.91	-	Total: 5.24 1 st : 3.69 2 nd : 3.32 3 rd : 7.11 4 th : 6.06 5 th : 5.64 Boy: 7.63 Girl: 2.91
Mihandoost [26]	Ilam 2011	3 rd 4 th 5 th	600	300	Researcher-made tests MFT WISC WADT	-	-	-	Total: 11.4 3 rd : 10.6 4 th : 11.5 5 th : 12.1 Boy: 4.82 Girl: 2.71
Alipoor et al. [12]	Qom 2011	3 rd 4 th 5 th	3282	1696	MLDDT RPM	Total: 2.93 Boy: 3.35 Girl: 2.49	-	-	Total: 2.93 Boy: 3.35 Girl: 2.49
Sharifi et al. [36]	ChaharMahal Bakhtiari 2012	1 st 2 nd	415	209	MLDDT phonological awareness test; Spelling test	Total: 7.46 1 st : 6.9 2 nd : 7.5 Boy: 8.13 Girl: 6.79	Total: 6.02 1 st : 5.42 2 nd : 7.55 Boy: 8.13 Girl: 3.88	Total: 7.22 1 st : 6.89 2 nd : 7.55 Boy: 7.65 Girl: 6.79	Total: 6.9 1 st : 6.39 2 nd : 7.53 Boy: 7.97 Girl: 5.82
Talepasand et al. [15]	Karaj 2012	3 rd 4 th 5 th	432	216	RPM MFT WADT MRS IKMT	Total: 0.46 3 rd : 0 4 th : 0 5 th : 0.92 Boy: 0.92 Girl: 0	-	-	Total: 0.46 3 rd : 0 4 th : 0 5 th : 0.92 Boy: 0.92 Girl: 0
Nojabae et al. [37]	Rasht 2012	1 st 2 nd 3 rd 4 th 5 th	5362	2717	Checklist of children characteristics with dyslexia IKMT WISC	Total: 0.76 1 st : 0.1 2 nd : 1.16 3 rd : 1.32 4 th : 0.44 5 th : 0.72 Boy: 0.4 Girl: 1.13	Total: 0.13 1 st : 0.61 2 nd : 0 3 rd : 0.08 4 th : 0 5 th : 0 Boy: 0.14 Girl: 0.11	Total: 0.54 1 st : 1.32 2 nd : 0.29 3 rd : 0.44 4 th : 0.17 5 th : 0.54 Boy: 0.58 Girl: 0.49	Total: 6.56 1 st : 6.93 2 nd : 5.91 3 rd : 5.74 4 th : 6.08 5 th : 8.18 Boy: 7.47 Girl: 5.63

Study	Location and Date	Grade	Sample Size (n)	Sex (Male)	Diagnostic Method	Prevalence of Math Disorder (%)	Prevalence of Reading Disorder (%)	Prevalence of Writing Disorder (%)	Prevalence of Learning Disorder (%)
Abtahi [16]	Qayen 2012	2 nd	200	100	Researcher-made math test	Total: 20.56 Boy: 19.34 Girl: 21.78	-	-	Total: 20.56 Boy: 19.34 Girl: 21.78
Khodadadi et al. [17]	Arak 2013	2 nd 4 th	1802	NR	RPM IKMT DSMIV	Total: 1.27 2 nd : 0.87 4 th : 1.68	-	-	Total: 1.27 2 nd : 0.87 4 th : 1.68
Eslami et al. [20]	Kerman 2014	1 st 2 nd 3 rd 4 th 5 th	793	426	Reading, dictation and mathematics tests The teachers' survey of learning disability WISC	Total: 13.8 1 st : 7.5 2 nd : 31.8 3 rd : 26.8 4 th : 30 5 th : 50 Boy: 15.25 Girl: 12.3	Total: 36.9 1 st : 91 2 nd : 76.5 3 rd : 73.2 4 th : 71.7 5 th : 60.9 Boy: 42.7 Girl: 30	Total: 4.5 1 st : 0 2 nd : 3 3 rd : 15.9 4 th : 21.7 5 th : 13 Boy: 5.4 Girl: 3.55	Total: 18.4 1 st : 32.83 2 nd : 37.1 3 rd : 38.63 4 th : 41.13 5 th : 41.3 Boy: 21.11 Girl: 15.28
Ghorbanibargani [38]	Ahva 2014	1 st 2 nd Third 3 rd 5 th 6 nd	1116	1116	SRIT	-	Total: 7.52 Boy: 7.52 1 st : 9.89 Second: 20.48 3 rd : 7.52 4 th : 4.16 5 th : 3.09 6 th : 2.04	-	Total: 7.52 Boy: 7.52 1 st : 9.89 2 nd : 20.48 3 rd : 7.52 4 th : 4.16 5 th : 3.09 6 th : 2.04
Zare Bahramabadi et al. [39]	Hamedan 2014	1 st 2 nd 3 rd 4 th 5 th 6 nd	1938	988	RLDT The Conners parent scale clock drawing test IKMT	Total: 3.3 Boy: 4.55 Girl: 2 First: 0.45 2 nd : 0.61 3 rd : 0.41 4 th : 0.5 5 th : 0.55 6 nd : 0.71	Total: 3.72 Boy: 6.07 Girl: 1.26 1 st : 0.65 2 nd : 0.51 3 rd : 0.4 4 th : 0.61 5 th : 0.66 6 nd : 0.82	-	Total: 3.5 Boy: 5.42 Girl: 1.59 1 st : 0.55 2 nd : 0.56 3 rd : 0.4 4 th : 0.55 5 th : 0.6 6 nd : 0.76
Moinalghorabaie et al. [40]	North Khorasan 2015	2 nd 3 rd 4 th 5 th	2120	1060	MLDDT RPM Reading and writing disorder diagnostic test researcher-made tests	Total: 6.09 2 nd : 1.13 3 rd : 9.8 4 th : 4.71 5 th : 3.77 Boy: 0.37 Girl: 1.88	Total: 3.39 2 nd : 6.22 3 rd : 3.58 4 th : 4.33 5 th : 2.26 Boy: 7.92 Girl: 4.52	Total: 4.71 2 nd : 5.47 3 rd : 5.84 4 th : 6.79 5 th : 1.5 Boy: 5.66 Girl: 5.28	Total: 4.73 2 nd : 4.27 3 rd : 6.4 4 th : 5.27 5 th : 2.51 Boy: 4.65 Girl: 3.89
Hakim et al. [41]	Ahvaz 2015	1 st 2 nd 3 rd 4 th 5 th	1000	1000	SRIT WRS reading comprehension	-	Total: 11.8 Boy: 11.8 1 st : 17.5 2 nd : 29 3 rd : 7 4 th : 3.5 5 th : 2	-	Total: 11.8 Boy: 11.8 1 st : 17.5 2 nd : 29 3 rd : 7 4 th : 3.5 5 th : 2
Ameri et al. [13]	Semnan 2015	2 nd 3 rd 4 th 5 th	34961	17480	WISC primary and secondary diagnostic questionnaire IKMT	Total: 1.55 Boy: 1.79 Girl: 1.6 2 nd : 3.38 3 rd : 3.52 4 th : 3.58 5 th : 3.09	Total: 1.69 Boy: 1.85 Girl: 1.7 2 nd : 3.48 3 rd : 3.7 4 th : 0.37 5 th : 3.23	Total: 2.75 Boy: 2.92 Girl: 2.45 2 nd : 2.49 3 rd : 2.73 4 th : 3.16 5 th : 2.93	Total: 1.18 Boy: 1.7 Girl: 1.51 2 nd : 3.11 3 rd : 3.31 4 th : 2.37 5 th : 3.08

Study	Location and Date	Grade	Sample Size (n)	Sex (Male)	Diagnostic Method	Prevalence of Math Disorder (%)	Prevalence of Reading Disorder (%)	Prevalence of Writing Disorder (%)	Prevalence of Learning Disorder (%)
Yavari et al. [42]	Arak 2019	1 st 2 nd 3 rd 4 th 5 th 6 nd	2135	1198	SRIT	-	Total: 9.93 Boy: 10.6 Girl: 9.07 1 st : 8.63 2 nd : 4.05 3 rd : 13.22 4 th : 20.32 5 th : 8.23 6 nd : 3.94	-	Total: 9.93 Boy: 10.6 Girl: 9.07 1 st : 8.63 2 nd : 4.05 3 rd : 13.22 4 th : 20.32 5 th : 8.23 6 nd : 3.94
Echreshavi et al. [14]	Ahvaz 2020	2 nd	387	144	RPM NAMA test	-	Total: 7.49 Boy: 10.41 Girl: 6.73	-	Total: 7.49 Boy: 10.41 Girl: 6.73
Pourmohammadreza Tajrishi et al. [43]	Karaj 2020	4 th 5 th 6 th	286	286	Goldstein non-verbal learning disabilities scale WISC	-	-	-	Total: 1.8 Boy: 1.8 4 th : 2.6 5 th : 0 6 th : 2.4
Yousefi et al. [44]	Karaj 2020	4 th 5 th 6 th	354	0	Goldstein non-verbal learning disabilities scale WISC	-	-	-	Total: 3.67 Girl: 3.67 4 th : 4.38 5 th : 4.2 6 th : 2.47
Ansari et al. [45]	Shahrekord 2021	-	123	123	CLDQ	Total: 3.97	Total: 3.95	-	Total: 3.96 Boy: 3.96
Gholamiyan et al. [19]	Mashhad 2022	1 st 2 nd 3 rd	2770	1389	SRIT	-	Total: 4.04 Boy: 3.6 Girl: 4.5 1 st : 8.55 2 nd : 2.31 3 rd : 3.55	-	Total: 4.04 Boy: 3.6 Girl: 4.5 1 st : 8.55 2 nd : 2.31 3 rd : 3.55

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Abbreviations: SRIT: Screening reading inventory test; WISC: Wechsler intelligence scale for children; IKMT: Iran key-math test; RPM: Raven progressive matrices; WADT: Wepman auditory discrimination test; CLDQ: Colorado learning disability questionnaire; MLDDT: Mathematics learning disorder diagnostic tests; RLDT: Reading level diagnostic test; WRS: Word reading score; MFT: Marian frastick test; MRS: Michael Rutter scales.

Note: Full dataset for this table is available at Mendeley data [DOI:10.17632/y5ymwhxfth.1]

Strengths and limitations

The strengths of this study include a comprehensive search strategy covering English and Persian literature, grade-specific estimates for all LD types, and rigorous meta-analytic techniques. However, several limitations must be acknowledged. High heterogeneity ($I^2 \approx 95\%$) likely reflects differences in diagnostic tools, study populations, and provincial representation. Study quality scores were not incorporated into weighting, and some studies used non-standardized instruments. Publication

bias was detected (Egger's test, $P=0.03$) and may have slightly inflated pooled estimates. Finally, Iran's multi-lingual and culturally diverse population means that regional differences may be masked, and cross-sectional, school-based samples may not capture out-of-school children or those in alternative education settings.

Future research

Future studies should use standardized and validated diagnostic tools, representative sampling, and clear re-

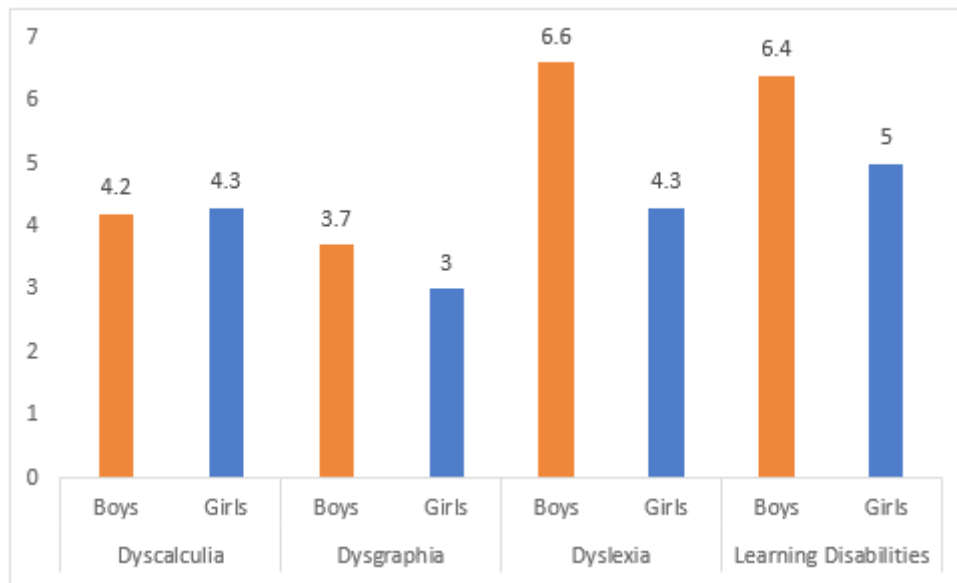


Figure 6. Comparison of the overall prevalence of learning disabilities in girls and boys

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porting of participant characteristics. Stratified analyses by province, language, gender, and socioeconomic status are recommended to improve accuracy. Advanced statistical techniques, such as meta-regression, may help to explore sources of heterogeneity, while prospective longitudinal designs could clarify developmental trajectories and causal mechanisms underlying LDs.

Conclusion

This systematic review and meta-analysis provide the most comprehensive estimates of LD prevalence among Iranian elementary students to date. Our results showed that at least one in 20 Iranian students has a learning disability, and this rate increases to one in ten in early grades. The relatively high prevalence underscores a significant public health and educational concern. There is an urgent need for national policies to standardize

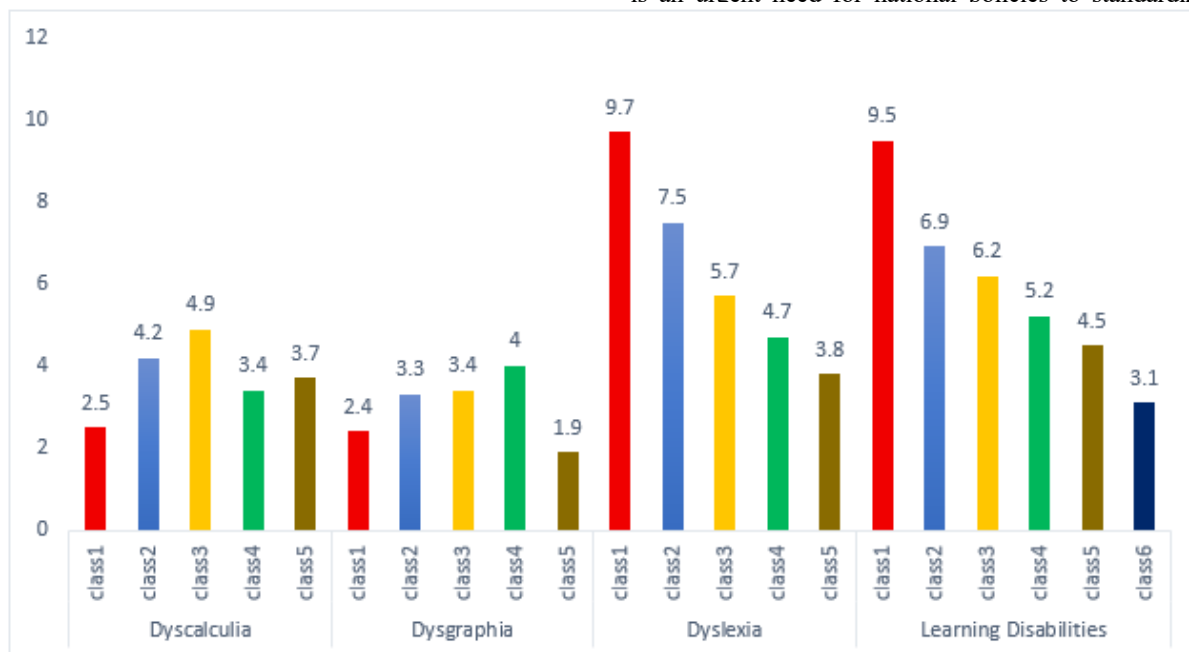


Figure 7. Comparison of the overall prevalence of learning disabilities by grade

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Table 3. Prevalence of different types of learning disorders and subgroup analysis

Variables			No. of Studies	Prevalence (95% CI)	I ²	P	
						Q-test	Subgroup Difference
Dyscalculia	Gender	Boys	13	4.2 (2.8, 6.3)	95.79	285.22	0.001
		Girls	13	4.3 (2.8, 6.5)	95.9	295.07	
	Grade	1	3	2.5 (0.5, 12.4)	88.93	81	0.001
		2	8	4.2 (1.7, 10.2)	97.8	331.3	
		3	7	4.9 (2.4, 9.8)	95.85	144.8	
		4	9	3.4 (1.9, 6)	94.60	148.3	
		5	7	3.7 (1.7, 7.9)	96.46	169.6	
Dysgraphia	Gender	Boys	8	3.7 (2.3, 6.1)	95.73	231.5	0.001
		Girls	8	3 (1.9, 4.8)	96.9	164.2	
		1	3	2.4 (0.6, 9.8)	89.9	19.86	
	Grade	2	5	3.3 (1.9, 5.8)	87.7	132.77	0.001
		3	6	3.4 (1.8, 6.4)	93.7	180.09	
		4	6	4 (2, 8)	95.2	105.7	
		5	5	1.9 (0.8, 4.5)	92.08	150.5	
Dyslexia	Gender	Boys	19	6.6 (3.9, 7.3)	97.49	639.5	0.001
		Girls	17	4.3 (2.7, 6.7)	98.38	1116.2	
		1	10	9.7 (5, 18.2)	95.42	196.53	
	Grade	2	14	7.5 (3.6, 14.9)	98.31	772.07	0.001
		3	16	5.7 (3.5, 9)	96.19	394.23	
		4	14	4.7 (2, 10.9)	97.86	608.3	
		5	12	3.8 (2, 7.2)	95.18	228.4	
Learning dis-abilities	Gender	Boys	27	6.4 (4.6, 8.7)	97.79	805.4	0.001
		Girls	25	5 (3.6, 6.9)	97.02	1179.2	
		1	10	9.5 (6.5, 13.7)	89.5	86.37	
	Grade	2	17	6.9 (4, 11.5)	97.6	677.9	0.001
		3	20	6.2 (4.4, 8.7)	94.5	348.1	
		4	22	5.2 (3.4, 8)	96.2	561.7	
		5	19	4.5 (2.9, 6.8)	95.4	392.8	
		6	4	3.1 (2.1, 4.7)	94.6	368.6	

screening, enhance diagnostic services, and implement early intervention programs, particularly in rural and resource-limited areas. High-quality, large-scale studies using standardized diagnostic tools are warranted to better understand the epidemiology of LDs in Iran.

Ethical Considerations

Compliance with ethical guidelines

The dataset extracted and analyzed during this systematic review and meta-analysis has been uploaded to Mendeley Data as supplementary data and is available at the following DOI: 10.17632/y5ymwhxfth.1.

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Authors' contributions

Study design and supervision: Alireza Aghaz; Statistical analyses: Roya Mokhtari Fard; Writing: Aynaz Holakouee; Final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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