The Probable Prevalence and Sociodemographic Characteristics of Specific Learning Disorder in Primary School Children in Edirne

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ABSTRACT

Introduction: The aim of this study was to research the probable prevalence of Specific Learning Disorder (SLD) in primary school children in Edirne City and the relationships with their sociodemographic characteristics.

Methods: The sample of our study was composed of 2,174 children who were educated in primary schools in second, third, and fourth grades in the academic year 2013–2014 in Edirne City. The teachers and parents of these children were given Specific Learning Difficulties Symptom Scale, Learning Disabilities Symptoms Checklist (teacher and parent forms), and sociodemographic data forms to fill in. Binary logistic regression analysis was used to assess the risk factors for SLD.

Results: Our study revealed that the probable prevalence of SLD was 13.6%; 17% for boys and 10.4% for girls. Reading impairment was

3.6%, writing impairment was 6.9%, and mathematic impairment was 6.5%. We determined that consanguineous marriages, low income, history of neonatal jaundice were found as risks for SLD; born by caesarean, developmental delay of walking, and history of neonatal jaundice were found as risks for mathematic impairment. A history of learning difficulties of parents was a risk factor for forming SLD and subtypes.

Conclusion: Our findings were consistent with other study results about the prevalence of SLD. The relationships between the probable prevalence rates and sociodemographic data were discussed.

Keywords: Specific learning disorder; child; prevalence

Cite this article as: Görker I, Bozatlı L, Korkmazlar Ü, Yücel Karadağ M, Ceylan C, Söğüt C, Aykutlu HC, Subay B, Turan N. The Probable Prevalence and Sociodemographic Characteristics of Specific Learning Disorder in Primary School Children in Edirne. Arch Neuropsychiatry 2017; 54:343-349.

INTRODUCTION

Specific Learning Disorder (SLD) is a neurodevelopmental disorder sourcing from biology affecting the acquisition or perception capabilities of the brain for the verbal and non-verbal information processes including the interaction of genetic, epigenetic, and environmental factors in its etiology with the abnormality of cognitive level associated with behavioral findings in the base at the cognitive level. In general, as the child starts school, the difficulties in understanding or learning, problems in writing or written expression, and difficulties in the perception/calculation of the numbers are the indicators and these matters make the academic performance of the child lower than expected. These problems cannot be explained with mental retardation, loss of sense, other psychiatric or neurological disorder; psychosocial difficulties, insufficiency of the language to be used in the academic environment or education problems. The types like reading disorder (dyslexia), written expression disorder (dysgraphia), and mathematics disorder (dyscalculia) can be seen together or separately. The frequency and prevalence of the SLD are stated in various reports with different rates depending on the size of the sample and the inclusion criteria. The SLD prevalence of school children from different language and cultures is 5%-15%, the reading disorder is 4%-9%, and the mathematics disorder is 3%-7%, as they are addressed (1). The number of the prevalence studies with diagnostic criteria or scales for SLD is low. On the other hand, SLD is accepted as relatively frequent and is not known sufficiently (2,3,4). Although It is stated that it is seen in boys more than girls in general, according to studies that showed gender differences in SLD, this subject is still uncertain (5,6).

In this study, it is aimed to examine the probable prevalence of the SLD in the second- and fourth-grade students, sociodemographic features, demographic characteristics of the SLD subtypes, and the relationships between the age and gender in the Edirne provincial center.

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Received: 04.04.2016 **Accepted:** 05.10.2016 **Available Online Date:** 08.11.2017

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METHODS

Sample

For our study, it was learned that 5,500 children were educated in primary schools in the second, third, and fourth grades in the spring time of the academic year 2013-2014 in Edirne City Centre, and it was aimed to contact all of them in these classes. Official permission of Edirne Provincial Directorate of National Education was obtained for our research that was approved by the Ethic Committee of Trakya University Faculty of Medicine as 2014/76. The principals of the schools were consulted with the aim of excluding children with physical and neurological diseases, hearing, seeing, and speaking disorders from the research. One school was excluded, as it did not accept to cooperate. The scales were distributed to the parents and teachers of the students to fill in, and the scales were sent to the parents by the teachers. Verbal informed consent was obtained from student's parents who participated in this study. Since the teachers of five schools did not fill in the scales completely, these students were excluded from the assessment, so we assessed 2,174 students whose parents and teachers completely filled in the scales. In order to collect the data, sociodemographic forms were prepared that were filled in by the parents to determine the sociodemographic characteristics and the past learning problems of parents by our clinic. The parents and teachers of the students were asked to fill in this form together with Specific Learning Disability Evaluation Scale and Learning Disorder Symptom Screening Scale (teacher and parent forms).

The Specific Learning Disability Evaluation Scale was developed as 36 items in 1992 by Korkmazlar (7,8). Some subtests were added in 1997 by Erman. This scanning scale is filled in by both parents and teachers, and it has 40 items. For the assessment, never=0, sometimes=1, frequently=2, always=3 as they are rated. The points to be taken from the scale are evaluated as risky for SLD if it is 1-40 points, mild SLD if it is 41-80, and serious SLD if it is 81-120. The Learning Disorder Symptom Screening Scale Teacher and Parents Form, developed by Korkmazlar (9), covers cognitive and academic talents together with reading, writing, mathematics and indicates 1 if the problems are highest to 5 if the problems are lowest as per a Likert-type scale. Points higher than 160 indicate no problem, 120-159 risky, 80-119 points middle-degree learning disorder, and 40-79 indicates serious learning disorder. Following the assessment of the scales, the students having serious learning disorder risk were included in the study.

In the second phase of this study, the SLD frequency is planned to be determined as a result of clinical assessments in cases having probable SLD findings according to the scales.

Statistical Analysis

The assessment was performed by using Statistical Package for the Social Sciences version 21.0 (IBM Corp.; Armonk, NY, USA) statistic program. Following the compatibility of the measurable data to normal distribution was controlled with single-sample Kolmogorov-Smirnov test, Mann-Whitney U test was used for the comparisons among the groups as it did not show normal distribution. Pearson χ^2 , Yates Pearson χ^2 , Fisher's exact test for qualitative data were used together with Kolmogorov-Smirnov two-samples test. Binary logistic regression analysis was used to assess the risk factors for SLD. As the definitive statistics, median (min-max) values and arithmetic averages $\pm$ standard deviation were given. The limit of meaning for all statistics was selected as $p < 0.05$.

RESULTS

The students ages between 7 and 13 years were assessed and 861 (39.2%) were from second grade, 739 (33.7%) from third grade and 595

(27.1%) from fifth grade, the average age for girls was 9.08 ± 1.075 years and for boys was 9.15 ± 1.082 years. The cases with probable SLD findings were found as 13.6% ($n=295$). Probable SLD for boys is 17% ($n=179$), for girls 10.4% ($n=116$), so following the Pearson χ^2 analysis, a meaningful statistical difference between girls and boys was found ($p=0.0001$) (Table 1). When the reading, writing, and mathematics difficulties were assessed individually, reading difficulty was 3.6%, writing difficulty was 6.9%, and mathematics difficulty was 6.5%.

As a result of the single-variable analyses, it was found that when independent variables found to be statistically significant were evaluated by logistic regression analysis, as the income of the parents of the children increases, the risk of probable SLD decreases. In other words, income level <850 TL is 5.21 times more at risk compared to income level 850-1,600 ($p=0.015$). The children with another medical disease history are 5 times more at risk for SLD than those without ($p=0.001$). In children with neonatal jaundice history, the prolonged duration of neonatal jaundice was found to increase SLD risk by a factor 1.168 ($p=0.018$). The children with parents who are relatives of each other are 7.81 times more at risk than those with parents who are not ($p=0.023$) (Table 2).

The reading difficulty risk is seen higher as the age of the children increases. In other words, as the age increases, the risk of reading difficulty increases more than 1.607 times ($p=0.007$). The children who were mentioned with previous psychiatric diagnosis are 3.98 times more at risk for SLD than those without ($p=0.005$). The reading difficulty risk of the children with neonatal jaundice history is 6.478 times more at risk than without ($p=0.006$). The reading difficulty risk for children whose mothers used medicines during the pregnancy is 4.20 times greater than non-users ($p=0.010$). The children who have mothers with a history of difficulties in mathematics are 2.31 times more at risk from reading difficulty than those who haven't had any such history ($p=0.043$). The children who have non-educated fathers are 111.11 times more at risk from SLD than those who have educated fathers ($p=0.003$) and 12.66 times more at risk than those who have highly educated fathers ($p=0.031$).

The children of families with an income less than 850 TL are 5.21 times more at risk from reading difficulties than those that have an income between 850 and 1,600 TL ($p=0.015$) (Table 3).

As the number of siblings increases, the risk of difficulty in mathematics increases. In other words, the children with two siblings show difficulties in

Table 1. The rates of prevalence SLD and the frequencies according to sex differences

			Results		
			Risk group	Healthy group	Total
Sex	Boys	n	179	876	1,055
		Sex %	17.0%	83.0%	100.0%
		Results %	60.7%	46.6%	48.5%
	Girls	n	116	1,003	1,119
		Sex %	10.4%	89.6%	100.0%
		Results %	39.3%	53.4%	51.5%
Total		n	295	1,879	2,174
		Sex %	13.6%	86.4%	100.0%
		Results %	100.0%	100.0%	100.0%
SLD: Spesific Learning Disorder					

Table 2. Logistic regression findings according to the total scores of scales in SLD

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP (B)
Income level			9.712	2	0.008		
Income level <850TL	-1.928	0.619	9.707	1	0.002	0.145	0.043-0.489
Income level >850TL	-0.822	0.489	2.828	1	0.093	0.439	0.168-1.146
Medical disease history*	-1.612	0.478	11.354	1	0.001	0.200	0.078-0.510
Neonatal jaundice history (day)	0.156	0.066	5.568	1	0.018	1.168	1.027-1.330
Parents who are relatives each other**	-2.055	0.907	5.139	1	0.023	0.128	0.022

SLD: Spesific Learning Disorder; B: coefficient for the constant; S.E: standart error; df: degree of freedom; Sig: signigance; Exp: odds ratio; C.I.: confidence interval
 *: Non-history of another medical diseases was taken as a reference category (1/0.200)=5)
 **: Non-relationship of relatives each other between parents was taken as a reference category (1/0.128=7.81)

Table 3. Logistic regression findings according to reading difficulties

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP (B)
Age	0.474	0.176	7.277	1	0.007	1.607	1.138-2.268
Psychiatric diagnosis history*	-1.384	0.494	7.855	1	0.005	0.251	0.095-0.660
Neonatal jaundice history (day)	1.868	0.686	7.409	1	0.006	6.478	1.687-24.873
Mothers with history of difficulties in mathematics**	-0.837	0.414	4.077	1	0.043	0.433	0.192-0.976
Used medicines during the pregnancy***	-1.435	0.555	6.674	1	0.010	0.238	0.080-0.707
Father's education			14.615	5	0.012		
Father's education (uneducated)****	-4.705	1.585	8.811	1	0.003	0.009	0.000-0.202
Father's education (educated in primary school)	-1.404	1.652	0.723	1	0.395	0.246	0.010-6.252
Father's education (educated in middle school)	-2.390	1.274	3.517	1	0.061	0.092	0.008-1.114
Father's education (educated in high school)	-1.315	1.328	0.980	1	0.322	0.269	0.020-3.628
Father's education (high educated)*****	-2.544	1.180	4.646	1	0.031	0.079	0.008-0.794
Income level			8.277	2	0.016		
Income level <850	-1.650	0.680	5.886	1	0.015	0.192	0.051-0.728
Income level >850*****	-0.512	0.607	0.709	1	0.400	0.600	0.182-1.972
Constant value	17.526	21915.637	0.000	1	0.999	40859501.162	

B: coefficient for the constant; S.E: standart error; df: degree of freedom; Sig: signigance; Exp: odds ratio; C.I.: confidence interval
 *: Children who had previous psychiatric diagnosis were taken as a reference category (1/0.251=3.98)
 **: Mothers with history of difficulties in mathematics was taken as a reference category (1/0.433=2.31)
 ***: No medication was taken during pregnancy was taken as a reference category (1/0.238=4.20)
 ****: Father's education/high educated was taken as a reference category (1/0.009=111.11, 1/0.079=12.66)
 *****: Income level >850 was taken as a reference category (1/0.015=5.21)

mathematics 14.699 times more than those with one sibling; similarly, for those with three siblings the number is 29.223 times, and with four siblings the number is 5.842 ($p=0.004$, 0.0001 , 0.042 , respectively). The children who were born by caesarean are 5.675 times more at risk for difficulties in mathematics than those born normally. The children with late walking history are 1.14 times more at risk for difficulties in mathematics ($p=0.001$). The children who had neonatal jaundice history are 35.371 times more at risk for difficulties in mathematics than who hadn't ($p=0.028$). The children with parents who are relatives of each other are 7.19 times more at risk for difficulties in mathematics ($p=0.007$). The children who have mothers with a history of difficulties in writing are 6.02 times more at risk for difficulties in mathematics ($p=0.017$). The children who have fathers with a history of difficulties in reading are 7.94 times more at risk for difficulties in mathematics ($p=0.005$) (Table 4).

The children who have mothers with a history of difficulties in reading are 5.18 times more at risk for difficulties in writing ($p=0.000$). The children

with mothers do not work are 4.2 times more at risk for difficulties in writing than those with mothers who work as civil servants ($p=0.000$) (Table 5).

DISCUSSION

The cases with probable SLD findings were found to be 13.6% in our study. The prevalence of the SLD including the educational fields of reading, writing, and mathematics in children at school age from different languages and cultures in DSM-5 as 5%-15% (1). This stated ratio interval is consistent with the findings of our study. In many studies, the data obtained on the frequency and prevalence of the SLD varies according to the size of the sample and the criteria for the inclusion in the study. Rutter and Yule (10) who were the early researchers on the matter found the prevalence of learning disorder to be 5% in 1975. DuPaul and Stoner (11) reviewed 17 different studies on ADHD children from 1978 to 1993, and they found the SLD prevalence to be 8.9% in the healthy control group. Polanczyk et al. (12) conducted a community study in 2007 and found

Table 4. Logistic regression findings according to mathematics difficulties

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP (B)
Numbers of siblings*			14.693	4	0.005		
2 siblings*	2.686	0.923	8.476	1	0.004	14.669	2.405-89.465
3 siblings*	3.375	0.904	13.937	1	0.000	29.223	4.968-171.88
4 siblings *	1.765	0.870	4.119	1	0.042	5.842	1.062-32.124
<4 siblings *	20.341	6695.561	0.000	1	0.998	682555745.463	0.000
Mothers with history of difficulties in writing***	-1.798	0.750	5.747	1	0.017	0.166	0.038-0.0720
Fathers with history of difficulties in reading****	-2.073	0.741	7.819	1	0.005	0.126	0.029-0.538
Born by caesarean	1.736	0.662	6.867	1	0.009	5.675	1.549-20.789
Walking time (month)**	-0.130	0.040	10.293	1	0.001	0.878	0.811-0.951
Neonatal jaundice history (day)*****	-1.249	0.568	4.837	1	0.028	0.287	0.094-0.0873
Parents who are relatives each other*****	-1.975	0.733	7.260	1	0.007	0.139	0.033-0.584
Constant value	19.058	40193.857	0.000	1	1.000	189162797.267	

B: coefficient for the constant; S.E: standart error; df: degree of freedom; Sig: significance; Exp: odds ratio; C.I.: confidence interval

*: Non-sibling status was taken as a reference category

** : Non-late walking status as a reference category

***: Mothers without history of difficulties in writing was taken as a reference category (1/0.166=6.02)

****: Fathers without history of difficulties in reading was taken as a reference category (1/0.126=7.94).

*****: Non-history of neonatal jaundice as a reference category (1/0.287=35.71)

*****: Non-relationship of relatives each other between parents was taken as a reference category (1/0.139=7.19)

Table 5. Logistic regression findings according to writing difficulties

Variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP (B)
Mothers with history of difficulties in reading *	-1.647	0.437	14.227	1	0.000	0.193	0.082-0.453
Mother's job			14.565	7	0.042		
Mother's job (student)	17.737	20096.48	0.000	1	0.999	50461194.44	0.000-
Mother's job (worker)	0.111	0.475	0.055	1	0.815	1.117	0.441-2.832
Mother's job (civil servant)**	-1.434	0.406	12.472	1	0.000	0.238	0.108-0.528
Mother's job (farmer)	18.726	19553.41	0.000	1	0.999	135681855	0.000
Mother's job (craftsman)	0.988	1.053	0.879	1	0.349	2.685	0.341-21.162
Mother's job (housewife)	-0.591	0.647	0.835	1	0.361	0.554	0.1560-1.967
Constant value	22.261	27413.117	0.000	1	0.999	4653370346	

B: coefficient for the constant; S.E: standart error; df: degree of freedom; Sig: significance; Exp: odds ratio; C.I.: confidence interval

*: Mothers without history of difficulties in reading was taken as a reference category (1/0.193=5.18).

** : The status of being a civil servant of mother was taken as a reference category (1/0.238=4.20).

the SLD frequency to be 5%. An important problem that is making the performance of the epidemiological studies harder is the lack of generally accepted definitions or diagnostic criteria for SLD, and evaluations based only on a scale or other assessments that measures the level of academic achievement. There have been many studies on SLD from the past to today and different ratios have been announced on the prevalence. In the studies performed in India, the SLD prevalence rate for third- to fifth-grade students was found to be 10.25%, 12.8% of 1,156 children were stated with learning difficulties without using any assessment tools, and also in another study, the prevalence was 15.17% in 8- to 11-year-old school children (13,14,15). The prevalence of the dyslexia ratio in more than 5,000 primary school students in China was found to be 3.9% with boy:girl ratio of 3:1 (16). In follow-up studies in Finland in 2014 with 9,215 children who were 7 to 8 years old, the SLD prevalence was found to be 19.9%; on the other hand, this rate in children and adolescences was 7.6% in school studies performed recently in four different regions of Brazil

(17,18). In a study performed in Italy in 2015, the prevalence of the SLD in primary school children was suggested at 6.06% (19). In the study among students in first to fifth grades in our country, probable SLD was suggested to be as high as 37% to 38% (20).

When the findings of our study were evaluated according to sex, the probable SLD ratio was 17% in boys and 10.4% in girls. At DSM-5, it was found that it is two to three times more prevalent in boys than in girls (1). In four different epidemiologic studies including 9,799 children from England, Wales, and New Zealand, boy/girl rates of reading difficulties were: 21.6%/7.9%, 20.6%/9.8%, 17.6%/13.0%, and 18.0%/13.0% (5). There are studies suggesting close rates of SLD for boys and girls (21). In our study, boy/girl rates of probable SLD were found to be high statistically but close to each other.

When the rates of the reading, writing, and mathematics in SLD are evaluated separately, the reading difficulties were 3.6%, writing difficulties were

6.9%, and mathematics difficulties were 6.5%. The prevalence was defined for reading disorder as 4% to 9%, mathematics disorder as 3% to 7% in DSM-V (1). Majority of the studies suggested that the prevalence of reading disorder was 5% to 17% (22). When the reading, writing, and mathematics difficulties were separated, or when reading and mathematics difficulties were grouped together, in studies conducted in different countries, the difficulty rates were found to be different from each other. In the study conducted with 1,476 children in 1983, the mathematics disorder rate was 3.6%, reading disorder was 2.2% (23); in the study conducted by Lewis et al. (24) in 1994 with 1,056 children who were 9 to 10 years old, the mathematics disorder was found to be 1.3% and reading disorder was 3.9%. In the study conducted by Miles et al. (25) in 1998, the reading disorder prevalence was suggested to be 4.19% and also in the study of Badian (26) in 1999 with 1,075 children, the reading disorder was suggested to be 6% and the mathematics disorder was suggested to be 3.9%.

In 2007, Von Aster et al. (27) performed a study with 337 children and the reading disorder was found in 3.3%, writing disorder in 5.7%, and mathematics disorder in 1.8%. In the study conducted by Landerl and Moll (28) in 2010 with 2,586 children, the reading disorder was found to be prevalent in 2.9%, written expression disorder was 4.1%, and mathematics disorder was 3.2%. Dhanda et al. (14) worked with 1,156 children and the reading disorder was 22%, written expression disorder was 22%, mathematics disorder was 16%. In one of the recent studies with 1,633 German children in third and fourth grades, the SLD frequency was investigated according to DSM-V criteria, and three different findings were calculated according to the 1, 1.25, and 1.5 standard deviations in the study method. Accordingly, the reading disorder for children having 1 as the standard deviation was estimated at 6.49%, written expression disorder was 6.67%, and mathematics disorder was 4.84%; the reading disorder for children having 1.25 as the standard deviation was estimated to be 5.14%, written expression disorder was 6.86%, and mathematics disorder was 3.31%; the reading disorder for children having 1.5 as the standard deviation had an estimated value of 3.8%, written expression disorder was 5.02%, and mathematics disorder was 2.39% (29). Cappa et al. (19) performed a study in 2015 where reading disorder was found to be 4.75%; Fortes et al. (18), on the other hand, found the cases of prevalence of SLD to be 7.6%, with reading disorder at 7.5%, writing disorder at 5.4%, and mathematics disorder at 6.0%.

In the studies assessing those three capability difficulties, while the writing difficulty was seen relatively higher like our study suggested, the rates in the reading and mathematics difficulties vary. The roles of family history and genetic load are considered in reading difficulties and mathematics difficulties, and it is suggested that phonologic problems stated in the etiology of the reading difficulties can create different rates of reading difficulties interculturally, depending on the spoken language. The difficulties in phonemic compliance led to phonologic problems leading to reading difficulties; so, it is suggested that reading difficulties are seen less in countries that have good phoneme-grapheme harmony, and there are higher rates in countries that have poor phoneme-grapheme harmony (22).

In the literature, developmental delay and chronic neurological disorders leading to the occurrence the SLD are defined as predeterminants. In many studies, the exposure during pregnancy to the use of medicines, exposure to radiation, smoking, infections, hypoxia, difficult birth, premature birth, low-weight birth, hypoxia after birth, brain trauma, delivery with low Apgar score, and some other similar factors are suggested as causes of future learning disorders for children (13). In the data that we took from sociodemographic information on our sample, it was found that the risk of difficulties in mathematics is 1.14 times higher in children with late

walking history ($p=0.001$), children with history of another medical disease are five times more at risk for SLD than without ($p=0.001$), children with mothers using medicines during pregnancy are 4.20 times more at risk for reading disorder ($p=0.010$), the risk of mathematics disorder in children delivered by caesarean is 5.675 times greater ($p=0.009$), children with neonatal jaundice history are 35.71 times more at risk for mathematics difficulty ($p=0.028$) and 6.478 times more at risk for reading difficulties ($p=0.006$) than without, the duration of neonatal jaundice increases the risk of SLD possibility 1.168 times more ($p=0.018$). The data that we found in relation with those parameters, which may damage the normal cognitive development in babies, proved to be meaningful. However, since we did not have sufficient detailed information from the parents of the history of other medical diseases, the use of medicines during pregnancy prevented us from assessing the findings. As is well-known, if neonatal jaundice can be prevented with treatment, it causes no sequela risk. However, some permanent cognitive sequela may occur as a result of acute or chronic bilirubin intoxication, which is defined as bilirubin-induced neurological dysfunction, basal ganglions especially, hippocampus, substantia nigra, various cranial nerves, brain stem nucleus, pons reticular structure, cerebellar nucleus, and medulla spinalis anterior horn cells were affected (30). This effect has a great range of spectrum from mild and indefinite neurological disorders (isolated audio neuropathy, behavioral disorders, dystonia, cognitive disorders, mild mental retardation) to acute bilirubin encephalopathy and post-icteric sequela (31,32). The information we obtained from our samples is insufficient to assess the types and severity of the neonatal jaundice. However, children who experienced this jaundice are at risk of having a high rate of mathematics difficulties, reading difficulties; also, the knowledge of the duration of the jaundice increases the SLD risk, suggesting that neonatal jaundice may cause a cognitive disorder that also may cause a learning problem.

In our study, important data addressing family load that is a significant parameter in SLD was obtained. It was found that children whose parents are relatives with each other are 7.81 times more at risk for SLD ($p=0.023$) and 7.19 times more at risk for mathematics difficulties ($p=0.007$). The sociodemographic data form provided to get the history of skills of mothers' reading-writing and mathematics; so it was determined that children who have mother's having history of difficulties in mathematics are 2.31 times more at risk for reading difficulties than those who haven't such history ($p=0.043$); children who have mother's having history of difficulties in writing are 6.02 times more at risk for mathematics difficulties ($p=0.017$); and children who have mother's having history of difficulties in reading are 5.18 times more at risk for writing difficulties ($p=0.000$). On the other hand, children with father's having history of difficulties in reading are 7.94 times more at risk for mathematics difficulties ($p=0.005$). When mothers and fathers are evaluated according to their level of education and occupations; children with mothers who do not work are 4.2 times more at risk for writing difficulties than children with mothers who work as civil servants ($p=0.000$), children with uneducated fathers are 11.11 times more at risk for reading difficulties than those with educated fathers ($p=0.003$), and they are 12.66 times more at risk for reading difficulties than with high-educated fathers ($p=0.031$). The literature states that more than 80% of children and adults with diagnosed dyslexia had a history of difficulties in their families (33). In recent studies, it is reported that being left-handed is meaningfully higher in the history of families of SLD cases, and it is also reported that there is a meaningfully higher family history of difficulties in reading of Greek adolescences and their siblings who had reading difficulties (13,34). It is noted that poorly educated parents are also an important factor for reading difficulties in children. Sun et al. (16) evaluated the prevalence and comorbidities of reading disorders and found that the level of education was seriously lower in families whose

children had reading disorders than compared with those that hadn't. Parental education deficiencies may also be due to a low socioeconomic level as well as a forward reflection of learning problems in their childhood. The low socioeconomic level is stated as an important factor for the formation of SLD (35). It was determined that children with low-income families are 5.21 times more at risk of having reading disorder than with middle-income families ($p=0.015$), as the income level of the families increase, SLD risk is found to decrease in our study, as in the literature ($p=0.002$).

SLD is a multifactorial disorder which has in its etiology a genetic predisposition and family load, developmental and cognitive factors, language spoken, and environmental factors including the level of education and socioeconomic situation. An educational approach and early intervention treatment after the awareness of SLD findings will reduce the difficulties that may arise with this disorder in the preschool period.

Limitations of the Study

In our study, high numbers of primary school students were taken into assessment in their schools, and the parents and teachers of 2,174 students were tried to be contacted individually, but despite this effort the total of 5,500 students who were detected, could not be reached. In addition to our assessment scales, the questions in the sociodemographic data forms were limited to a certain amount so as not to be overwhelming. Therefore, the information in the history of medical and psychiatric diseases of the children could not be very detailed for all children. Thus, the assessment of comorbidities in children who were thought to be probable SLD cases was insufficient because of the lack of information about psychiatric or other medical comorbidities. Although the prevalence rates of SLD in primary school children in our findings were consistent with the prevalence rates of SLD in the literature, our study showed the probable learning difficulties in children, as there was a scale-based evaluation. In the second part of our study, detailed evaluations about diagnosis and other comorbidities for SLD were targeted, and also children indicating probable SLD at 13.6% were directed to our clinic for diagnostic assessments. It is planned to determine the prevalence of SLD with the obtained findings.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Trakya University School of Medicine.

Informed Consent: Verbal informed consent was obtained from student's parents who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - I.G.; Design - I.G., L.B., Ü.K.; Supervision - Ü.K.; Resource - Ü.K., I.G.; Materials - Ü.K.; Data Collection and/or Processing - L.B., M.Y.K., C.C., C.S., H.C.A., B.S., N.T.; Analysis and/or Interpretation - I.G., Ü.K., L.B., N.T.; Literature Search - I.G., L.B.; Writing - I.G.; Critical Reviews - I.G., L.B., N.T.

Acknowledgements: The authors would like to thank the Edirne Education Directorate for their contributions to this study.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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