



**ORIGINAL RESEARCH PAPER**

**Paediatrics**

**PREVALENCE OF LEARNING DISABILITY IN CHILDREN AGED 8 TO 18 YEARS OF JAIPUR CITY**

**KEY WORDS:**

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**INTRODUCTION**

LD is "a neurological disorder that affects the brain's ability to receive process, store and respond to information. The term learning disability is used to describe the seeming unexplained difficulty a person of at least average intelligence for the age has in acquiring basic academic skills. Academic problems such as reading slowly and incorrectly, making repeated spelling mistakes, skipping lines while reading aloud (dyslexia), untidy/illegible handwriting with poor sequencing (dysgraphia), inability to perform even simple mathematics (dyscalculia) and problems with motor tasks, such as hand-eye coordination (dyspraxia) are common presenting complaints of children with learning disabilities. Achievement of academic grades in schools is poor and did not reflect the intellectual abilities which these children possess. Diagnosis of learning disabilities is a team work of parents, pediatricians, teachers, school psychologist and occupational/speech & language therapist. Because of linguistic diversity in India, diagnosis of learning disabilities is very difficult because ready-made standardized tools are not available in all the Indian languages.

**AIMS AND OBJECTIVE**

- 1) To assess the prevalence of learning disability in children of Jaipur city.
- 2) To identify factors affecting learning disability in normal healthy children.

**MATERIALS AND METHODS**

**STUDY SITE**

Different schools in Jaipur City.

**STUDY POPULATION**

Children with age group 8-18 years from different schools in Jaipur City.

**STUDY DESIGN**

School based cross-sectional study

**INCLUSION CRITERIA**

The children of age group 8-18 years of either sex (from class 3rd-class 12<sup>th</sup>) were included in the study

**EXCLUSION CRITERIA**

Children with concomitant neurological, psychiatric or chronic systemic illness will be excluded from the study  
Sample size-510 children

**OBSERVATION AND RESULTS**

Demographic details of the participants is shown in tables given below

**Table 1: Demographic Profile of Study Population**

SN	Demographic Profile	No. of participants (n=510)	Percentage
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1-	Age (years)		
	≤10 years	279	54.7
	>10 years	231	45.3
	Min-Max (Median): 8-16 (10.0) years; Mean±SD: 10.23±1.65 years		
2-	Gender		
	female	230	45.1
	male	280	54.9
3-	Habitat		
	Urban	510	100.0
4-	Socio-economic Status		
	Upper middle		90
	Middle		10

**Table 2: Incidence of Various Learning Disabilities among Study Population (n=510)**

SN	Learning Disabilities	No. of participants	Percentage
1-	Maths	24	4.7
2-	Reading	60	11.8
3-	Writing	82	16.1
4-	Expression (including Poor spelling)	5	1.0
5-	Any of the above (Any disability)	102	20.0

Most common learning disability among participants of the study was Writing disabilities (16.1%) followed by Reading disabilities (11.8%), least common learning disability was Expression (1.0%) followed by learning of Maths (4.7%). It was observed that out of 510 participants, 102 (20.0%) were found to have at least one of the above learning disability.

Out of 24 participants with learning disability in mathematics, 5 had learning disability in maths alone, 3 along with learning disability in reading and 16 along with disability in reading & writing both.

Out of 60 participants of learning disability in reading, only 9 had learning disability of reading alone, 30 along with writing, 3 along with reading, 2 along with writing & expression and 16 along with reading, writing & maths learning disabilities.

Out of 82 participants with writing learning disabilities, 34 had writing disabilities alone, 30 along with reading learning disabilities, 2 along with reading & expression learning disabilities and 16 along with reading & maths learning disabilities.

Out of 5 participants with learning disabilities of expression, 3 had learning disability of expression alone while 2 had along with Reading & Writing disabilities.

**Table 3: Association of Mathematical Learning Disability with demographic, Clinical & Anthropometric Variables**

SN	Variables	Total (N=510)	Disabled (n=24)		No Disability (n=486)		Significance of	
			No.	%	No.	%	$\chi^2$	P
1-	Age							
	≤1<10 yrs	279	11	3.9	268	96.1	0.800	0.371
	>1>10 yrs	231	13	5.6	218	94.4		
2-	Gender							
	Fe female	230	3	1.3	227	98.7	10.809	0.001
	male	280	21	7.5	259	92.5		
3-	Pallor							
	Pallor +nt	90	11	12.2	79	87.8	13.768	<0.001
	Pallor -nt	420	13	3.1	407	96.9		
4-	Mean Height (cms)	130.58± 7.16	129.58±8.63		130.63±7.09		0.701; p=484	
5-	Mean weight (kg)	25.89± 5.89	25.71±5.03		25.90±5.62		't'=0.167; p=0.868	

**Graph 3(a): Association of Mathematical Learning Disability with Age, Gender and Pallor**

Incidence of mathematical learning disability was significantly higher (p=0.001) among male (7.5%) as compared to females (1.3%).

Incidence of mathematical learning disability was 4.7% (24/510). Incidence of mathematical learning disability is higher in age group >10 years (5.6%) as compared to age group ≤10 years but this association was not found to be statistically significant.

Incidence of mathematical learning disability was significantly higher among participants presenting with any signs of pallor (12.2%) as compared to those presenting without pallor (3.1%) (p=0.001).

**Table 4: Association of Reading Learning Disability with demographic, Clinical & Anthropometric Variables**

SN	Variables	Total (N=510)	Disabled (n=60)		No Disability (n=450)		Significance of	
			No.	%	No.	%	$\chi^2$	P
1-	Age							
	≤1<10 yrs	279	45	16.1	234	83.9	11.302	0.001
	>1>10 yrs	231	15	6.5	216	93.5		
2-	Gender							
	F Female	230	23	10.0	207	90.0	1.257	0.262
	Male	280	37	13.2	243	86.8		
3-	Pallor							
	Pallor +nt	90	15	16.7	75	83.3	2.530	0.112
	Pallor -nt	420	45	10.7	375	89.3		
4-	Mean Height (cms)	130.58± 7.16	126.13±9.00		131.18±6.67		5.256; p<0.001	
5-	Mean weight (kg)	25.89± 5.89	22.68±6.05		26.32±5.39		't'=4.842; p<0.001	

**Graph 4(a): Association of Reading Learning Disability with Age, Gender and Pallor**

Incidence of Reading learning disability was higher among male (13.2%) as compared to females (10.0%) but this association was not found to be statistically significant (p=0.262).

Incidence of Reading learning disability was 11.8% (60/510).

Incidence of Reading learning disability was significantly higher (p=0.001) in age group ≤10 years (16.1%) as compared to age group >10 years (6.5%).

Incidence of Reading learning disability was higher among participants presenting with signs of pallor (16.7%) as compared to those presenting without pallor (10.7%), this association too was not found to be statistically significant (p=0.112).

**Table 5: Association of Writing Learning Disability with demographic, Clinical & Anthropometric Variables**

SN	Variables	Total (N=510)	Disabled (n=82)		Enabled (n=428)		Significance of difference	
			No.	%	No.	%	$\chi^2$	P
1-	Age							
	≤1<10 yrs	279	59	21.1	220	78.9	11.728	0.001
	>10 yrs	231	23	10.0	208	90.0		
2-	Gender							
	FF female	230	28	12.2	202	87.8	4.733	0.030
	Male	280	54	19.3	226	80.7		
3-	Pallor							
	Papallor +nt	90	20	22.2	70	77.8	3.057	0.080
	Papallor -nt	420	62	14.8	358	85.2		
4-	Mean Height (cms)	130.58± 7.16	127.33±7.91		131.21±6.84		't'=4.578; p<0.001	
5-	Mean weight (kg)	25.89± 5.89	24.49±6.09		26.16±5.45		't'=2.501; p=0.013	

**Table 6: Association of Expression Learning Disability with demographic, Clinical & Anthropometric Variables**

SN	Variables	Total (N=510)	Disabled (n=5)		Enabled (n=505)	
			No.	%	No.	%
1-	Age					
	≤1<10 yrs	279	2	0.7	277	99.3
	>1>10 yrs	231	3	1.3	228	98.7
2-	Gender					
	Fe female	230	0	0.0	230	100.0

	M male	280	5	1.8	275	98.2
3-	Pallor					
	Pall pallor +nt	90	5	5.6	85	94.4
	Pall pallor -nt	420	0	0.0	420	100.0
4-	Mean Height (cms)	130.58± 7.16	128.60±0.55		130.60±7.20	
5-	Mean weight (kg)	25.89± 5.89	27.00±10.95		25.88±5.53	

As learning disability of expressions (including spelling errors) was observed in only 5 participants, statistical tools were not applied.

**Table 7: Association of Any Learning Disability with demographic, Clinical & Anthropometric Variables**

SN	Variables	Total (N=510)	Disabled (n=102)		Enabled (n=408)		Significance of difference	
			No.	%	No.	%	χ <sup>2</sup>	P
1-	Age							
	≤ <10 yrs	279	68	24.4	211	75.6	7.361	0.007
	>1>10 yrs	231	34	14.7	197	85.3		
2-	Gender							
	Fe female	230	34	14.8	196	85.2	7.127	0.008
	M male	280	68	24.3	212	75.7		
3-	Pallor							
	Pall pallor +nt	90	31	34.4	59	65.6	14.251	<0.001
	Pall pallor -nt	420	71	16.9	349	83.1		
4-	Mean Height (cms)	130.58± 7.16	127.39±8.52		131.38±6.56		't'=5.156; p<0.001	
5-	Mean weight (kg)	25.89± 5.89	24.73±6.22		26.19±5.39		't'=2.372; p=0.018	

**Graph 7(a): Association of Any Learning Disability with Age, Gender and Pallor**

Incidence of any learning disability was 20.0% (102/51)

Incidence of any learning disability was significantly higher (p=0.007) in age group ≤10 years (24.4%) as compared to age group >10 years (14.7%).

Incidence of learning disability was significantly higher (p=0.008) among males (24.3%) as compared to females (14.8%).

Incidence of learning disability was higher among participants presenting with signs of pallor (34.4%) as compared to those presenting without symptoms of pallor (16.9%), this association was found to be statistically significant (p<0.001).

**DISCUSSION**

The present study was an attempt to assess the prevalence of learning disability in children aged 8 to 18 years of Jaipur city. For this purpose, a total of 510 children aged 8-18 years were assessed. Majority of children (54.7%) were ≤10 years old. Mean age of children was 10.23±1.65 years. Learning disability is an important concern in young school aged children and its early identification helps in starting an early intervention and suitable modifications in teaching techniques while simultaneously giving emotional and mental support. There is difficulty in assessing the children below 8 years of age whereas after 18 years, there is little room for improvement, hence the age span of the children identified by us was most appropriate.

In present study, we had used Learning Disability Child/Teen Questionnaire<sup>47</sup>. One of the issues in assessment of learning disability is the selection of appropriate tool for the purpose of identification. The complexity of reading processes and their underlying relationship with language pose problems for the assessment of reading and writing disorders. The reading process and its relationship with language possess complex problems for assessing reading, writing and learning disabilities. Whatever tools are available for assessment of learning disabled children, addresses psychometric and or criteria based approaches but they sometimes fail to diagnose various skill problems and in turn affects the management and education planning of these children. It is very important to assess whether it is inherent learning disability or due to strange school environment which incorporates totally different language (Ramaa, 2000). The screening for learning disability in school going children is in such denovo state that neither experts are available everywhere nor financial resources are available which can help in periodic assessment of children. In present study, we used the original English version of the scale only and that is why we carried out assessment in English medium schools only.

**SUMMARY**

The present study was conducted to assess the prevalence of learning disability in children aged 8 to 18 years of Jaipur city. During planned field visits to various schools in Jaipur city 510 children aged 8-18 years were screened and assessed for their learning ability with help of adapted version of a predesigned and pretested questionnaire freely available from Harborside Counseling Services was used which is "Learning Disability: Child/Teen Screening Questionnaire". Mean age of participant children was 10.23±1.65 years (ranged between 8-14 years), majority were males (54.0%) and from Upper middle and middle class of the society. None had and developmental or systemic abnormality nor were taking any medication for any abnormality, around 17.6% were found to have pallor during clinical examination. Findings of the study were as under:

- 1- Out of 510 participants 82 (16.1%) were found to have Writing learning disability, 60 (11.8%) have Reading learning disability, 24 (4.7%) had learning disability in Mathematics and 5 (1.0%) had learning disability of expression. Total 102 (20.0%) participants had at least one learning disability.
- 2- Only 5 participants had learning disability of mathematics alone, 9 had learning disability of reading alone, 34 had learning disability of writing alone, and 3 had learning disability of expression alone.
- 3- Among participants with Mathematical learning disabilities (n=24) significantly highly proportion of males as compared to females (7.5% vs. 1.3%); (p=0.001), presenting with pallor as compared to those without pallor (7.5% vs. 1.3%); (p<0.001) was found. No significant association with anthropometric variables and age of the participants with mathematical learning disabilities with their counterparts having no mathematical learning disability was observed.
- 4- Among participants with Reading learning disabilities (n=60) significantly highly proportion of participants aged ≤10 years as compared to >10 years (16.1% vs. 6.5%) (p=0.001) was found. Association of Reading learning disability with gender (p=0.262) and presentation with pallor (p=0.112) was not found to be statistically significant.
- 5- Among participants with Writing learning disabilities (n=82) significantly highly proportion of participants aged ≤10 years as compared to >10 years (21.1% vs. 10.0%), (p=0.001); males as compared to females (19.3% vs. 12.2%), (p=0.030) had learning disabilities. Association of presenting with/without pallor with writing learning disability was not found to be significant statistically (p=0.080).
- 6- Out of 510 patients only 5 (1.0%) patients had learning disability of expression.
- 7- Among participants (n=102) with any of the learning disabilities significantly highly proportion of participants aged ≤10 years as compared to >10 years (24.4% vs.

14.7%)( $p=0.007$ ), males as compared to females (24.3% vs. 14.8%)( $p=0.008$ ), presenting with pallor as compared to normal (34.4% vs. 16.9%)( $p<0.001$ ) had learning disabilities.

**CONCLUSION**

Aim of this cross sectional study was to establish the prevalence of learning disability in school going children aged 8 to 18 years of Jaipur city and evaluate its determinants. A predesigned and pretested questionnaire from Harborside Counseling Services was used which is "Learning Disability: Child/Teen Screening Questionnaire". Mean age of participant children was  $10.23 \pm 1.65$  years (ranged between 8-14 years), majority were males (54.0%) and from Upper middle and middle class of the society.

In our study out of 510 participants 82 (16.1%) were found to have Writing learning disability, 60 (11.8%) have Reading learning disability, 24 (4.7%) had learning disability in Mathematics and 5 (1.0%) had learning disability of expression. Total 102 (20.0%) participants had at least one learning disability. Only 5 participants had learning disability of mathematics alone, 9 had learning disability of reading alone, 34 had learning disability of writing alone, and 3 had learning disability of expression alone.

Out of 60 participants of learning disability in reading, only 9 had learning disability of reading alone, 30 along with writing, 3 along with reading, 2 along with writing & expression and 16 along with reading, writing & maths learning disabilities.

Out of 82 participants with writing learning disabilities, 34 had writing disabilities alone, 30 along with reading learning disabilities, 2 along with reading & expression learning disabilities and 16 along with reading & mathematic learning disabilities.

Out of 5 participants with learning disabilities of expression, 3 had learning disability of expression alone while 2 had along with Reading & Writing disabilities.

3. Mathematical learning disabilities were more prevalent in males as compared to females and 7.5% presented with pallor as compared to those without pallor (1.3%).
4. Reading learning disabilities was more prevalent aged  $\leq 10$  years as compared to  $>10$  years. Association of Reading learning disability was not found to be statistically significant with sex, pallor or other anthropometric variables.
5. Writing learning disabilities was more prevalent age  $\leq 10$  years as compared to  $>10$  years and in males as compared to females. No association was found with pallor,
6. Out of 510 patients only 5 (1.0%) patients had learning disability of expression.

Hence our study has showed that learning disabilities is quite common in our study population and have remained unexplored till now.

The present study showed that learning disabilities are quite common in our study population and have remained unexplored till now. Learning disabilities in our study population showed a relationship with age, general health and developmental status, thus indicating malnutrition and physical morbidity as the determinants. The present study was a preliminary assessment in which extensive assessment related with health, morbidity status, maternal health and other sociodemographic correlates could not be done. Further studies on a larger size with inclusion of more variables are recommended. Cross-validation in different settings is also recommended. Most importantly development of local tools is required which could encompass the rural population.