

Prevalence of Dyslexia among School Children in Western Rajasthan, Jaipur

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I. Introduction

Dyslexia is defined as difficulty in learning to read despite conventional instruction, adequate intelligence, and socio-cultural opportunity.^{1,2} The term dyslexia has been accredited to Professor Rudolf Berlin.³ It is derived from the Greek prefix 'dys' and the root-word 'lexis'. The former means 'difficulty' whereas the latter means 'word or language'. It can be best translated as 'difficulty with words'.^{4,5} It is a 'hidden' disability as there are no obvious external signs for people to recognize.⁶ Lack of assessment may result in low self-esteem as compared to non-dyslexic students.^{7,8} and lack of appropriate help and support can have long-term effects on people with dyslexia when reaching adulthood.⁹

Dyslexia is one of the common learning disability with a prevalence ranging from 5 to 17.5% among school age children.^{10,11,12,13} The overall prevalence of dyslexia in different parts of the world is variable. (3.6 to 8.5% in Italy vs. 4.5 to 12.0% in the United States).¹⁴ Globally it is found to be more prevalent among boys ^{15, 16} approximately 3.4:1.¹⁸ Genetic predisposition is also seen among individuals having reading disorder or dyslexia.¹⁹ Hallgren in 1950 reported that, the risk of dyslexia in first-degree relatives is almost 41%. Eighty eight percent of the families studied had at least one dyslexic member.⁵ Dyslexic child can be from any background or any socio economic status and it can occur in any child in a family irrespective of the order in which he or she is born.²⁰ Dyslexic people often have a natural talent for any of the arts (such as music, dance, drawing, or acting). They often possess capability to see patterns in noise, which helps them to produce mundane into something more interesting and exciting.²¹ Moreover, Indian studies on dyslexia are very few in number and considering the extent of the problem a lot needs to be done in this field.²² Therefore this study was planned to estimate the prevalence of dyslexia among school children to bridge this gap.

II. Material and Methods

This study was carried out in Department of Psychiatry, Mahatma Gandhi Medical College & Hospital, Jaipur from April 2013 to August 2014. The study protocol was approved by the Ethics Committee of Mahatma Gandhi Medical College & Hospital. Permission from the Principal of the school and a written informed consent was taken from the parents before starting the study.

Sample size: A total of 800 children; 500 students from class 3rd and 4th and 300 in class 5th from a CBSE affiliated coeducational public school at Jaipur were enrolled in this study. The pre-tested, structured dyslexia screening questionnaire was used.

Methodology: Various research tools were used to conduct the study are (a) Specific Learning Disability - Screening Questionnaire (SLD-SQ),²³ (b) Malin's Intelligence Scale for Indian Children (MISIC)²⁴ and (c) Diagnostic Test for Reading Disorder (DTRD)²⁵ The study was conducted in two phases. In phase 1 specially designed Proforma was given to the parents and data on SLD-SQ was obtained from the parents with the help of clinical psychologist. In phase 2: The children who scored four and above on SLQ-SQ were further evaluated for Intelligence Quotient using MISIC by taking help of clinical psychologist and then they were assessed on diagnostic test for reading disorder (DTRD) to make a diagnosis of reading disorder.

Statistical analysis: Analysis of the result was done by calculating the frequencies and percentages of the variables relating to socio-demographic factors of the total sample. Data obtained with the help of screening questionnaires, Intelligent Quotient (IQ) assessment, Diagnostic tests were analyzed by calculating chi-square, mean and standard deviation. In order to find out the significance of difference on various scores in the two groups, student 't'- test was used. All the statistical analysis was done with the help of MS excel and Premier of biostatistics.

III. Results

Out of 800 children, parents of 42 children did not give their consent to participate in the study and 18 children in class 3rd were found to be below the age of 8 years, so they were excluded from this study. Thus the total sample consisted of 740 children out of which 478(63%) were males and 262(37%) females. The prevalence of reading disorder (dyslexia) was 7.43% in the present study. The prevalence of dyslexia was higher in male children 81% while only 19% female children were dyslexic. Out of 740 children 402(59%) in non-dyslexic group were in the age group of 10-11 years, where as in dyslexic group subjects were approximately equally distributed in all the four age groups(22%, 27%,27% and 24% respectively).

Table 1: Distribution of the children in the non-dyslexic and dyslexic group according to their age

Age	Non-Dyslexic (N=685)	Dyslexic (N=55)
8 Year	165 (24%)	12(22%)
9 Year	118 (17%)	15(27%)
10 Year	282(41%)	15(27%)
11 Year	120(18%)	13(24%)

$\chi^2= 6.48, df=3, p>0.05 (0.091)$ not significant

Table 2 : Comparison of birth order in non-dyslexic and dyslexic children

Birth Order	Non-Dyslexic (N=685)	Dyslexic (N=55)
Only Child	64(9%)	2(3.6%)
First Child	289(42%)	33(60%)
Last Child	255(37%)	15(27.4%)
Other	77(12%)	5(9%)

$\chi^2=7.17, df=3, p>0.05 (0.067)$ not significant

Table 3: Comparison of family type in non-dyslexic and dyslexic children

Family Type	Non-Dyslexic (N=685)	Dyslexic (N=55)
Joint	461(67%)	45(82%)
Nuclear	224(33%)	10(18%)

$\chi^2=4.96, df=1, p<0.05 (0.026)$ Significant

Table 4 : Comparison of family history of psychiatric illness in non-dyslexic and dyslexic children

History of Psychiatric Illness in Family	Non-Dyslexic (N=685)	Dyslexic (N=55)
Absent	683(99.7%)	52(94.5%)
Present	2(0.3%)	3(5.5%)

$\chi^2=34.3, df=1, p<0.05 (0.000)$ Highly significant

IV. Discussion

Children have varied reading ages. Some will read at their real age, others will read far above their real ages while others will read lower than their real ages. In the present study, among the school children in Jaipur, the prevalence of dyslexia is found to be 7.43%. These findings are supported by the studies done by Mogasale et al²⁶., Choudhary et al²⁷., Roongpraiwan et al¹⁸. Shayawitz et al¹⁷. and Berger et al²⁸., who have reported the prevalence of dyslexia 11.2%, 7.47%, from 6.9% to 9.0%, 6.3%, around 7% and 9.9% respectively. The findings are in contradiction with the results of the studies done by Siddqui & Tripathi²⁹, Dhanda & Jagawat³⁰, Donfrancesco et al³¹., Saviour and Ramachandra³² and Williams and McGee³³ who have reported a prevalence of dyslexia 2.26% in English medium schools and 3.36% in hindi medium schools, 2.7%, 28.07%, 27.8% and 33% respectively. These differences may be due to the fact that difference in methods and tools used, sample taken from different geographical areas that varied with respect to age, language and size of the sample. Apart from these studies many researchers^{34,35,36,37,38,39,30,26,27,13} have focused on prevalence of learning disabilities which includes dyslexia, dyscalculia and dysgraphia. They have reported a prevalence of 2 to 17.5% which also support above results.

In this study, prevalence of dyslexia was observed more among males being 81% and only 19% females were dyslexics which is in consistent with Roongpraiwan et al¹⁸ Karande & Venkataraman,³⁶ Sauver et al,⁴⁰ Shifrer et al,⁴¹ Flannery et al,⁴² Lewis et al³⁹ and Rutter & Yule⁴³. However Tomblin et al³⁸ and Cecila et al.⁴⁴ reported a little difference in the prevalence of dyslexia/ SpLD in boys and girls, there by indicate contradiction.

In present study dyslexic group were approximately equally distributed in the age groups 8, 9, 10 and 11 years and there was no significant difference among different ages and presence of reading disorder which is in consistent with various authors^{27,29,30} who all have reported the prevalence of LD in age group of 8-11 years.

Our study reveals that 64(9%) children in non-dyslexic group were only child of their parents followed by 289(42%) first born, 255(37%) were last born and 77(12%) were others, where as in the dyslexic group

2(3.6%) were only child followed by 33(60%) first order, 15(27.4%) last born and 5(9%) other order children. The difference between the two groups was not statistically significant. Our findings are consistent with several other studies Karande & Venkataraman,³⁶ Choudhary et al²⁷ and Donfrancesco et al.³¹ However Dhanda & Jagawat³⁰ have reported a significant difference in birth order of dyslexia and their total sample studied. Therefore, these results are in contradiction to the present ones.

In Present study we did a comparison between the two groups with respect to family type. 461(67%) children in non dyslexic group belonged to joint family and 224(33%) belonged to nuclear family, whereas in dyslexic group 45(82%) children were from joint families and 10(18%) belonged to nuclear family. The difference was statistically significant between the two groups. This indicates that dyslexia and type of family are related. Our findings are in the accordance with the findings of study done by Saviour and Ramachandra³² who have also reported a preponderance of extended / joint family in their sample. On the contrary Dhanda & Jagawat³⁰ and Choudhary et al²⁷ have reported more number of dyslexia/ SpLD children in nuclear families.

In Results of this study 683(99.7%) non dyslexic and 52 (94.5%) dyslexic children there was no family history of psychiatric illness whereas 2(0.3%) non-dyslexic and 3(5.5%) dyslexic children had positive family history of psychiatric illness. The difference between the two groups was statistically highly significant. These results are supported by the results of the study done by Choudhary et al.²⁷ who have also reported presence of psychiatric illness in the families of SpLD children. These findings have the indirect support (though in the present study family history of dyslexia has not been included) of the studies done by Saviour and Ramachandra et al,³² Fisher and Smith⁴⁵ who have reported impact of family history dyslexia/ SpLD on development of dyslexia/SpLD in children.

V. Conclusion

Prevalence of dyslexia is higher among children especially among male children. It is an invisible handicap. Early diagnosis of dyslexia at the age of 8 to 11 years with appropriate intervention or learning strategies can be started to prevent further handicap in their learning. If the problem of reading disorder remains undetected, the child's academic problems may have an adverse impact on their quality of life viz: self image, peer and family relations and social interactions. Therefore, early detection of the disorder by a multidisciplinary team comprising of pediatrician, counselor, clinical psychologist, psychiatrist and special educator may be helpful in training the children in a better way to bring them into the mainstream.

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