

## Psychological Co-morbidity in Children with Specific Learning Disorders

**Manoj K. Sahoo, Haritha Biswas, Susanta Kumar Padhy<sup>1</sup>**

*Department of Psychiatry, Tata Main Hospital, Jamshedpur, Jharkhand, <sup>1</sup>Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh, India*

### ABSTRACT

Children under 19 years of age constitute over 40% of India's population and information about their mental health needs is a national imperative. Children with specific learning disorders (SLDs) exhibit academic difficulties disproportionate to their intellectual capacities. Prevalence of SLD ranges from 2% to 10%. Dyslexia (developmental reading disorder) is the most common type, affecting 80% of all SLD. About 30% of learning disabled children have behavioral and emotional problems, which range from attention deficit hyperactivity disorder (most common) to depression, anxiety, suicide etc., to substance abuse (least common). Co-occurrence of such problems with SLD further adds to the academic difficulty. In such instances, diagnosis is difficult and tricky; improvement in academics demands comprehensive holistic treatment approach. SLD remains a large public health problem because of under-recognition, inadequate treatment and therefore merits greater effort to understand the co-morbidities, especially in the Indian population. As the literature is scarce regarding co-morbid conditions in learning disability in Indian scenario, the present study has tried to focus on Indian population. The educational concessions (recent most) given to such children by Central Board of Secondary Education, New Delhi are referred to. The issues to be addressed by the family physicians are: Low level of awareness among families and teachers, improper dissemination of accurate information about psychological problems, available help seeking avenues, need to develop service delivery models in rural and urban areas and focus on the integration of mental health and primary care keeping such co-morbidity in mind.

**Keywords:** India, learning difficulty, learning disorders, psychological co-morbidity, specific learning disorder

### Introduction

The current conceptualization of learning disorders (LDs), formerly referred to as academic skills disorders,<sup>[1,2]</sup> follows the traditional approach of classifying learning by specific academic skills. These skills include reading, mathematics and written expression. In each case, the skills are measured by standardized tests whose scores must fall substantially below the level expected with respect to age, intelligence and age-appropriate education. These deficits interfere with academic skills, leading to low grades or failures. Other associated features are low self-esteem, demoralization, social skills deficits, dropping out of school and difficulties in employment and social adjustment.<sup>[3]</sup>

Schools play a crucial and formative role in the spheres of cognitive, language, emotional, social and moral development of

a child.<sup>[4]</sup> Academic skills such as reading, writing and mathematics form the foundations upon which a student's performance at school is assessed. A learning problem may, therefore, create feelings of anxiety, inadequacy and shame, leading to behavioral disturbances in children of school age.<sup>[5]</sup> Any negative feedback from school is likely to have an impact on the emotional, social and family functioning of a child.

Children with learning disorders (LD) are those who exhibit academic difficulties out of proportion to their intellectual capacities. They have impaired ability in learning the academic skills of reading, writing, arithmetic or spelling. As per the Diagnostic and Statistical Manual of Mental Disorders – IV (DSM-IV)<sup>[1]</sup> learning disorders are of four types: Reading disorder (RD), mathematics disorder, disorder of written expression and Learning disorder not otherwise specified. Estimates of the prevalence of learning disorders range from 2% to 10% depending on the nature of ascertainment and the definitions applied across various countries.<sup>[1,2]</sup>

#### Access this article online

##### Quick Response Code:



**Website:**  
www.jfmprc.com

**DOI:**  
10.4103/2249-4863.152243

**Address for correspondence:** Dr. Susanta Kumar Padhy,  
Department of Psychiatry, Postgraduate Institute of Medical  
Education and Research, Sector 12, Chandigarh - 160 012, India.  
E-mail: susanta.pgi30@yahoo.in

## Psychological Co-morbidity

Learning disabilities are frequently associated with psychological problems.<sup>[6,7]</sup> Results of the population-based surveys suggest that about 30% of learning disabled children have behavioral and emotional problems.<sup>[8]</sup> Psychopathology worsens with age in children with nonverbal learning disabilities.<sup>[9]</sup> Marked anxiety can appear when children with dyscalculia are confronted with reasonably simple arithmetic problems.<sup>[10]</sup> A study by Ekblad<sup>[11,12]</sup> found a positive correlation between psychological disturbance and poor school achievement among Chinese children. Shenoy and Kapur<sup>[13]</sup> noted that 21 out of 88 children with learning disability had a co-morbid psychological diagnosis. Kishore *et al.*<sup>[14]</sup> reported that 21 out of 56 children with specific developmental disorders of scholastic skills had a co-morbid psychological disorder.

John<sup>[15]</sup> found that one-third of scholastically backward children had a co-morbid psychological problem. Of these, 16% had disorder of emotion, 6% had conduct disorder (CD) and 12% had mixed disorders of emotion and conduct. In a retrospective study at child and adolescent unit at National Institute of Mental Health and Neurosciences, Bengaluru; Muthukumar *et al.*<sup>[16]</sup> found that 79% of children with learning disabilities had comorbid psychological disorders, in which 32% had internalizing disorders, 28% had externalizing disorders and 19% had other disorders. In a study by Bäcker and Neuhäuser,<sup>[17]</sup> on 77 children with dyslexia, psychological co-morbidity was found in 66.2%. Of these, the most frequent was adjustment disorders, followed by hyperkinetic disorders and anxiety. Willcutt and Pennington<sup>[7]</sup> from the University of Colorado reported that children and adolescents with reading disability exhibited significantly higher rates of all internalizing and externalizing disorders than individuals without reading disabilities.

## Externalizing Disorders

### Attention deficit hyperactivity disorder, oppositional defiant disorder and conduct disorder

One of the most common co-morbid conditions in childhood is that of reading disabilities and attention deficit hyperactivity disorder (ADHD).<sup>[18,19]</sup> Children with specific learning disabilities (SpLDs) show an increased risk of hyperactivity.<sup>[20,21]</sup> There is a strong relationship between inattentiveness and reading disabilities.<sup>[22]</sup> Reported rates of co-morbid ADHD in learning disabled children vary from about 10% to as high as 60% depending on the specific sample examined.<sup>[23-25]</sup> The subgroup of children with ADHD plus LD deserves special clinical and educational attention.<sup>[19]</sup> Owing to the high degree of overlap between reading disabilities and ADHD, detecting the existence of ADHD in the reading disabled child is important in order to gauge better the intervention required.<sup>[18]</sup> Learning disabilities are accompanied by personality characteristics that predispose the individual to CD.<sup>[26]</sup>

McGee *et al.*<sup>[8]</sup> in a study in New Zealand, found that reading disabled boys were about 3 times as likely as their peers to have an externalizing disorder, particularly ADHD, CD or oppositional defiant disorder (ODD). The presence of one or more type of

LD was more common in the 86 children with ADHD (69.8%) than in the 33 children without ADHD (39.4%), this was primarily because of the disproportionate number of children with LD in written expression (ADHD, 65.1%; without ADHD, 27.3%, and spelling (ADHD, 30.2%; without ADHD, 6.1%). Although learning disabilities in math (numerical operations) and reading (basic reading or reading comprehension) were more prevalent in children with ADHD than in children without ADHD, the differences in frequencies were not significant.

In samples of children with ADHD, estimates of the prevalence of LD ranged from 15% to 50% for reading, 24% to 60% for math, 24% to 60% for spelling. Overall, 25% to 50% of children with ADHD have LD.<sup>[27]</sup>

The prevalence of RD is significantly higher than would be expected by chance in samples of individuals with ADHD, with the rate of comorbidity typically falling between 25% and 40%.<sup>[28]</sup> RD is nearly equally frequent in boys and girls in community samples (boy/girl ratio of 1.2–1.5/1), in clinic samples approximately 4 times more boys than girls meet criteria for RD.<sup>[29]</sup> More boys than girls meet criteria for ADHD in both community and clinical samples, but the boy/girl ratio is again substantially higher in clinic samples (9/1) than in school-based or community samples.<sup>[30]</sup> These gender differences in the overall prevalence of RD and ADHD suggest that the relation between the two disorders might also be different in boys and girls.<sup>[31]</sup>

## Internalizing Disorders

### Depression

Kashani *et al.*<sup>[32]</sup> studied the co-occurrence of major depressive disorder (MDD) and learning disabilities in 100 children aged 9–12 years, 62% of children with MDD had learning disability (LD), whereas only 22% of nondepressed children had LD. The authors felt that this three-fold increase in LD observed among MDD children implied either a causal relationship between LD and MDD or a predisposition for some children to manifest both conditions. Livingston<sup>[33]</sup> reviewed the literature on co-morbid depression and learning disability and hypothesized three potential relationships: Depression causes or exacerbates learning problems. Learning disabilities cause or exacerbate depression. A specific brain dysfunction can lead to both MDD and LD in some children. Livingston suggested that determining rates of LD in MDD children would be important in clarifying the nature of the relationship between these disorders. The link between suicide and learning disabilities has been suggested by Peck.<sup>[34]</sup>

Fristad *et al.*<sup>[35]</sup> of Ohio State University, determined the occurrence of learning disability in 30 inpatient children aged 6–12 years with MDD and found that learning disabilities occurred 7 times more often compared with community based rates (33% vs. 4.7%).

Huntington and Bender<sup>[36]</sup> reviewed the literature from 1984 to 1993 on emotional well-being in adolescents with learning

disabilities. It was concluded that adolescents with learning disabilities have a less positive academic self-concept, experience higher levels of trait anxiety and have a higher prevalence of somatic complaints. Adolescents with learning disabilities had high rates of depression and alarming rates of suicide.

In a study by Srinath *et al.*<sup>[37]</sup> The specific learning disorder (SLD) battery identified 149 (9.4%) children as having scholastic problems (rural: 11.7%; slum: 9.0%; urban: 6.6%). Of these children, 114 (7.2%) did not have any other Axis 1 disorder but did poorly only on the SLD Battery. These children could not be diagnosed as having SLD, as per International Classification of Diseases Tenth Revision-Diagnostic Criteria for Research criteria as most of them lacked adequate schooling.

### Suicide and Learning Disability

Adolescents with significant reading problems are at higher risk for behavioral and emotional difficulties than adolescents with typical reading ability.<sup>[38]</sup> Moreover, youth with learning disabilities (LD) have been suggested to be at increased risk for suicidal behaviors.<sup>[36,39]</sup>

According to Wagner *et al.*,<sup>[40]</sup> degree to which reading problems trigger a cycle of negative self-evaluation and emotion, eventually leading to efforts to escape aversive situations and self-awareness, the adolescents with single word reading problems have higher rates of school dropout and suicidality.

Baumeister<sup>[41]</sup> proposed that some instances of suicide were thought to represent an effort to “escape from the self” following situations that led to perceptions of limitations. It is possible that the stresses associated with reading difficulties add to or interact with other risk factors or stresses in the adolescent’s lives to significantly increase the likelihood of outcomes such as suicidality and school dropout.<sup>[38]</sup>

### Behavioral and Emotional Problems of Students with Learning Disabilities

Martínez and Semrud-Clikeman<sup>[42]</sup> found that students with LD expressed more loneliness, more victimization, and less social satisfaction (i.e. school integration) than their non-LD matched peers. Clinical observations of students with LD also show that this population tends to suffer chronic low levels of depression and anxiety and are more depressed than peers who do not have LD, thus more susceptible to emotional and social problems than children without LD. According to an Indian study by Karande *et al.*<sup>[25]</sup> behavioral problems were diagnosed in 20 (40%) children. Aggressive behavior even after minimal stressors was noted in 15 (30%) children. Withdrawn behavior was noted in another 5 (10%) children. None of the children’s symptoms/behaviors met the DSM-IV threshold for diagnosing anxiety disorder, depression, ODD or CD.

Whitney and Smith<sup>[43]</sup> posits that the academic failure leads to impairments in psychosocial functioning. That is, for children with LD, depression is an expected cognitive and emotional response

to chronic academic failure. In line with the academic difficulties hypothesis, the students with multiple learning disabilities, especially in the core academic areas (reading and math), have to exert greater efforts to compensate academically and emotionally for their learning deficits compared to students with a single learning disability and peers without LD. As a result of experiencing academic problems in multiple academic areas (e.g., mathematics and reading), psychosocial stressors would be more apparent in students with multiple LD compared to students with LD in a single academic area and students with no LD.

Based on the research till date and on the characteristics common to children with LD and children who are bullied, there is reason to believe that children with LD are at greater risk of peer victimization. In contrast, there are no consistent findings to indicate that children with LD are significantly more likely to bully others.<sup>[44]</sup>

A meta-analysis of studies investigating the social skills of children with LD indicated that about 75% of students with LD “would receive a more negative assessment of social skills and at a level that would distinguish them clearly from non-LD comparison group.”<sup>[45]</sup>

### Learning Disability and Substance Abuse

One mediator of risk for these children may exist in the domain of cognitive deficits related to learning and academic performance. Poor academic performance is a known predictor of later substance use and abuse, and delinquent adolescents are consistently found to have IQ deficits.<sup>[46]</sup> If any conclusions that are drawn about prediction to substance use from LD, have been in a positive light, as children without LD are more likely to try cigarettes at an early age. Research groups have reported positive associations between cognitive performance variables and substance use. Higher reading readiness and IQ predicted earlier and more frequent use of alcohol in adolescence, and also reported that higher IQ predicted higher lifetime cocaine use in young adults’ ages 19–26 years in a national probability sample. At least for adolescence, taken together, these findings might suggest a pathway for at-risk children whereby greater intellectual capacity and performance lead to more rapid experimentation with “grown-up” behaviors such as cigarette smoking and alcohol use.<sup>[46]</sup>

### Anxiety disorders

Prior *et al.*<sup>[47]</sup> found that in children with arithmetic difficulties, phobic disorder or anxiety was the most common co-morbidity (30%). Of the children with both spelling and arithmetic difficulties, 24% had phobic disorder or anxiety. Cantwell and Baker<sup>[20]</sup> noted that children with learning disabilities had increased rates of mood disorders.

Students with LD have basic psychological and/or neuropsychological deficits that impede their ability to perform well in basic academic areas.<sup>[48]</sup> These problems increase the likelihood that classroom tests will be regarded as a substantial threat, thus increasing test anxiety. In fact, studies have shown

that students with LD experience more difficulties in evaluative situations than students without LD.<sup>[49]</sup> Gender differences in test anxiety have been reported in the literature, with female respondents scoring higher than male respondents on self-report measures of test.<sup>[50]</sup> Numerous explanations have been offered to account for the gender differences in anxiety, in LD including differences in socialization patterns,<sup>[51]</sup> differences in coping styles, and differences in willingness to admit to anxiety.<sup>[52]</sup>

Besides gender and LD, age was a significant predictor of test anxiety. Older age predicted higher cognitive obstruction/inattention scores and lower physiological hyperarousal scores. Age differences in test anxiety have been noted in the literature,<sup>[53]</sup> but the age differences reported have been at the total test anxiety level. Perhaps, test anxiety symptoms vary somewhat as a function of age, with physical symptoms more common during childhood and cognitive symptoms - more specifically, cognitive obstruction and inattention symptoms - more common during adolescence and adulthood.<sup>[54]</sup>

### Implications

At present, only the national Educational Boards which conduct the Indian Certificate of Secondary Education and the Central Board of Secondary Education (CBSE) examinations, and the state government of Maharashtra have formally granted children with SpLD the benefit of availing the necessary provisions from standard I to XII. However, these provisions are not yet available to many children with SpLD in our country baring few larger cities and schools; and especially to those who are studying in vernacular medium schools.<sup>[55]</sup> The latest circular of 2008 of CBSE Board, New Delhi in respect of the educational concession to such children can be referred in.<sup>[56]</sup>

### Conclusion

There is a high risk of psychological co-morbidity in learning disabled children. The comorbidity of developmental dyslexia with both internalizing and externalizing disorders as well as with other learning disabilities underscores the need for cognitive and behavioral approaches in the remediation programs offered to dyslexic children. Early diagnosis and intervention in children with learning disorders makes a substantial improvement in self-confidence and social competency, which helps them in opening windows of opportunity in school and in the world of work.

The review summaries there are definite implications for clinical training, practice and policy initiatives. The issues to be addressed are: Low level of awareness among families and teachers, improper dissemination of accurate information about psychological problems, available help seeking avenues, need to develop service delivery models in rural and urban areas and focus on the integration of mental health into general health care keeping such co-morbidity in mind. Manpower and training issues for pharmacological and psychosocial interventions should be of paramount in the planning effective services for SLD. Effective networking between mental health professionals, pediatricians,

community-based health services and professionals from the education sector would be essential, too.

### References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4<sup>th</sup> ed. Washington DC: American Psychiatric Association; 1994.
2. Padhy SK, Goel S, Das SS, Vijaylakshmi L. Prevalence and patterns of learning disabilities in school going children in a northern city of India. National Medical Journal of India. 2015 [in press].
3. Kohli A, Malhotra S, Mohanty M, Khehra N, Kaur M. Specific learning disabilities in children: Deficits and neuropsychological profile. Int J Rehabil Res 2005;28:165-9.
4. Kapur M. Mental Health of Indian Children. New Delhi: Sage Publications; 1995.
5. Johnson B. Psychological co-morbidity in children and adolescents with learning disorders. J Indian Assoc Child Adolesc Mental Health 2005;7:55-9.
6. Rutter M. Emotional disorder and educational underachievement. Arch Dis Child 1974;49:249-56.
7. Willcutt EG, Pennington BF. Psychiatric comorbidity in children and adolescents with reading disability. J Child Psychol Psychiatry 2000;41:1039-48.
8. McGee R, Williams S, Share DL, Anderson J, and Silva P. The relationship between specific reading retardation, general reading backwardness and behavioural problems in a large sample of Dunedin boys: A longitudinal study from 5-11 years. J Child Psychol Psychiatry 1986;27:597-610.
9. Rourke BP. Socioemotional disturbances of learning disabled children. J Consult Clin Psychol 1988;56:801-10.
10. Garnett K, Fleischner JE. Mathematical disabilities. Pediatr Ann 1987;16:159-62, 167-8, 170-6.
11. Ekblad S. The children's behaviour questionnaire for completion by parents and teachers in a Chinese sample. J Child Psychol Psychiatry 1990;31:775-91.
12. Padhy SK, Goel S, Das SS, Vijaylaxmi L, Panigrahi M. Perceptions of teachers about learning disorder in a northern city of India: A cross sectional study. Indian Journal of Medical Sciences 2015 [in press].
13. Shenoy J, Kapur M. Prevalence of scholastic backwardness among five to eight year old children. Indian J Psychiatry 1996;38:201-7.
14. Kishore AN, Shaji KS, Pravinlal K, Harish MT, Nair SB, Joseph E. Psychiatric morbidity in children - A preliminary analysis. Kerala J Psychiatry 2000;14:39-44.
15. John A. A study of scholastic backwardness in a child guidance clinic. Unpublished Doctoral Thesis, Bangalore University; 1989.
16. Muthukumar K, Shashikiran MG, Srinath S. A study of co-morbid disorders in children and adolescents presenting with scholastic backwardness. Paper Presented at 5<sup>th</sup> IACAM Conference, Bangalore; 1999.
17. Bäcker A, Neuhäuser G. Internalizing and externalizing syndrome in reading and writing disorders. Prax Kinderpsychol Kinderpsychiatr 2003;52:329-37.
18. Beitchman JH, Young AR. Learning disorders with a special emphasis on reading disorders: A review of the past 10 years. J Am Acad Child Adolesc Psychiatry 1997;36:1020-32.
19. Biederman J, Newcorn J, Sprich S. Comorbidity of attention

- deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders. *Am J Psychiatry* 1991;148:564-77.
20. Cantwell DP, Baker L. Association between attention deficit-hyperactivity disorder and learning disorders. *J Learn Disabil* 1991;24:88-95.
  21. Faraone SV, Biederman J, Lehman BK, Spencer T, Norman D, Sediman LJ. Intellectual performance and school failure in children with attention deficit hyperactivity disorder and in their siblings. *J Abnorm Psychol* 1993;102:616-23.
  22. Rowe KJ, Rowe KS. The relationship between inattentiveness in the classroom and reading achievement (Part A): Methodological issues. *J Am Acad Child Adolesc Psychiatry* 1992;31:349-56.
  23. Halperin JM, Gittelman R, Klein DF, Rudel RG. Reading-disabled hyperactive children: A distinct subgroup of attention deficit disorder with hyperactivity? *J Abnorm Child Psychol* 1984;12:1-14.
  24. Holborow PL, Berry PS. Hyperactivity and learning difficulties. *J Learn Disabil* 1986;19:426-31.
  25. Karande S, Satam N, Kulkarni M, Sholapurwala R, Chitre A, Shah N. Clinical and psychoeducational profile of children with specific learning disability and co-occurring attention-deficit hyperactivity disorder. *Indian J Med Sci* 2007;61:639-47.
  26. Larson KA. A research review and alternative hypothesis explaining the link between learning disability and delinquency. *J Learn Disabil* 1988;21:357-63, 369.
  27. Barkley RA: Educational placement and classroom management. In: Barkley RA, editor. *Attention Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment*: New York: Guilford; 1994.
  28. Dykman RA, Ackerman PT. Attention deficit disorder and specific reading disability: Separate but often overlapping disorders. *J Learn Disabil* 1991;24:96-103.
  29. Pennington BF. *Diagnosing Learning Disabilities*. New York: Guilford Press; 1991.
  30. Szatmari P, Offord DR, Boyle MH. Correlates, associated impairments and patterns of service utilization of children with attention deficit disorder: Findings from the Ontario Child Health Study. *J Child Psychol Psychiatry* 1989;30:205-17.
  31. McGee R, Feehan M, Williams S, Partridge F, Silva PA, Kelly J. DSM-III disorders in a large sample of adolescents. *J Am Acad Child Adolesc Psychiatry* 1990;29:611-9.
  32. Kashani JH, Cantwell DP, Shekim WO, Reid JC. Major depressive disorder in children admitted to an inpatient community mental health center. *Am J Psychiatry* 1982;139:671-2.
  33. Livingston R. Depressive illness and learning difficulties: Research needs and practical implications. *J Learn Disabil* 1985;18:518-20.
  34. Peck M. Crisis intervention with chronically and acutely suicidal adolescents. In: Peck M, Farberow HL, Litman RE, editors. *Youth Suicide*. New York: Springer; 1985. p. 112-22.
  35. Fristad MA, Topolosky S, Weller EB, Weller RA. Depression and learning disabilities in children. *J Affect Disord* 1992;26:53-8.
  36. Huntington DD, Bender WN. Adolescents with learning disabilities at risk? Emotional well-being, depression, suicide. *J Learn Disabil* 1993;26:159-66.
  37. Srinath S, Girimaji SC, Gururaj G, Seshadri S, Subbakrishna DK, Bhola P, *et al.* Epidemiological study of child and adolescent psychiatric disorders in urban and rural areas of Bangalore, India. *Indian J Med Res* 2005;122:67-79.
  38. Daniel SS, Walsh AK, Goldston DB, Arnold EM, Reboussin BA, Wood FB. Suicidality, school dropout, and reading problems among adolescents. *J Learn Disabil* 2006;39:507-14.
  39. Bender WN, Rosenkrans CB, Crane M. Stress, depression, and suicide among students with learning disabilities: Assessing the risk. *Learn Disabil Q* 1999;22:143-56.
  40. Wagner M, D'Amico R, Marder C, Newman L, Blackorby J. What happens next? Trends in postschool outcomes of youth with disabilities. The Second Comprehensive Report from the National Longitudinal Transition Study of Special Education Students. Menlo Park, CA: SRI International; 1992.
  41. Baumeister RF. Suicide as escape from self. *Psychol Rev* 1990;97:90-113.
  42. Martinez RS, Semrud-Clikeman M. Emotional adjustment and school functioning of young adolescents with multiple versus single learning disabilities. *J Learn Disabil* 2004;37:411-20.
  43. Whitney I, Smith PK, Thompson D. Bullying and children with special educational needs. In: Smith PK, Sharp S, editors. *School Bullying: Insights and Perspectives*. London: Routledge; 1994. p. 213-40.
  44. Nabuzoka D. Issues and developments in special education. In: Grigorenko EL, editor. *Educating Individuals with Disabilities: IDEIA 2004 and Beyond*. New York: Springer; 2008.
  45. Mayes SD, Calhoun SL, Crowell EW. Learning disabilities and ADHD: Overlapping spectrum disorders. *J Learn Disabil* 2000;33:417-24.
  46. Molina BS, Pelham WE. Substance use, substance abuse, and LD among adolescents with a childhood history of ADHD. *J Learn Disabil* 2001;34:333-42, 351.
  47. Prior M, Smart D, Sanson A, Oberklaid F. Relationships between learning difficulties and psychological problems in preadolescent children from a longitudinal sample. *J Am Acad Child Adolesc Psychiatry* 1999;38:429-36.
  48. Swanson S, Howell C. Test anxiety in adolescents with learning disabilities and behavior disorders. *Except Child* 2005;62:389-97.
  49. Heiman T, Prezel K. Students with learning disabilities in higher education: Academic strategies profile. *J Learn Disabil* 2003;36:248-58.
  50. Wren DG, Benson J. Measuring test anxiety in children: Scale development and internal construct validation. *Anxiety Stress Coping* 2004;17:227-40.
  51. Maccoby EE, Jacklin CN. *The Psychology of Sex Differences*. Stanford, CA: Stanford University Press; 1974.
  52. Zeidner M. *Test Anxiety: The State of the Art*. New York: Plenum Press; 1998.
  53. Hembree R. Correlates, causes, effects, and treatment of test anxiety. *Rev Educ Res* 1988;58:47-77.
  54. Wigfield A, Eccles JS. Test anxiety in elementary and secondary school students. *Educ Psychol* 1989;24:159-83.
  55. Kulkarni M, Karande S, Thadhani A, Maru H, Sholapurwala R. Educational provisions and learning disability. *Indian J Pediatr* 2006;73:789-93.
  56. Available from: <http://www.cbse.nic.in/circulars/circ45-2008.doc>. [Last accessed on 2014 Feb 09].

**How to cite this article:** Sahoo MK, Biswas H, Padhy SK. Psychological co-morbidity in children with specific learning disorders. *J Fam Med Primary Care* 2015;4:21-5.

**Source of Support:** Nil. **Conflict of Interest:** None declared.