Consensus Statement of the Indian Academy of Pediatrics on Evaluation and Management of Learning Disability

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for the National Consultation Meeting for developing Indian Academy of Pediatrics (IAP), Guidelines on Neuro-developmental Disorders under the aegis of IAP Childhood Disability Group and the Committee on Child Development and Neurodevelopmental Disorders
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Justification: Learning Disability (LD) in children is a well-recognized developmental disorder, which has profound academic and psychosocial consequences. Due to the complex nature of LD and multiple disadvantages posed to the child due to LD, a multidisciplinary approach towards intervention is warranted. Given the paucity of evidence-based standardized treatment approaches, consensus guidelines for management of LD are needed.

Process: The meeting on formulation of national consensus guidelines on neurodevelopmental disorders was organized by Indian Academy of Pediatrics in Mumbai on 18th and 19th December, 2015. The invited experts included Pediatricians, Developmental Pediatricians, Pediatric Neurologists, Psychiatrists, Remedial Educators and Clinical Psychologists. The participants framed guidelines after extensive discussions. Thereafter, a committee was established to review and finalize the points discussed in the meeting.

Objective: To provide guidelines on evaluation and management of LD in children in India.

Recommendations: A basic intervention approach should focus on: (*i*) interpretation of evaluation reports; (*ii*) description of specific skills that may be delayed (e.g., phoneme awareness and phonics; reading comprehension; spelling; number sense and organizational skills) and (*iii*) identification of co-morbidities. The intervention should be inter-disciplinary and individualized to each child. Required services include: developmental pediatrics evaluation; neurological evaluation; ophthalmology and audiology evaluation; clinical psychology assessment; occupational therapy, remedial education, counseling for family, and career-counselling.

Keywords: *Disability, Dyslexia, Special Needs, Inclusive education, Learning Disorders.*

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Learning Disability (LD) in children is a well-recognized developmental disorder with profound academic and psychosocial consequences. Due to the complex nature of LD and the multiple disadvantages posed to the child due to LD, a multidisciplinary approach towards intervention is warranted. Given the paucity of published standardized treatment approaches for use in India, consensus guidelines for management of LD are needed.

The meeting on formulation of national consensus guidelines on neurodevelopmental disorders was organized by Indian Academy of Pediatrics in Mumbai, on 18th and 19th December, 2015. The invited experts included Pediatricians, Developmental pediatricians, Pediatric neurologists, Psychiatrists, Remedial educators and Clinical psychologists. The participants framed guidelines after extensive discussions. Thereafter, a committee was established to review and finalize the points discussed in the meeting. The following sections include the points of consensus on evaluation and management of LD.

Terminology: The term 'Learning Disability' (LD) is used synonymously with Specific Learning Disability and Specific Learning Disorder, the latter used by the fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [1]. However, in some countries, the term refers to intellectual disability (formerly called 'mental retardation) [2,3].

Definition: LDs are a heterogeneous group of disorders where the individual unexpectedly fails to competently acquire, retrieve and use information. The academic achievement is lower than expected, based on the child's overall intelligence [2-4]. LD has been defined as a neurodevelopmental disorder of biological origin manifesting in learning difficulties and problems in acquiring academic skills, which are markedly below age

level. LD manifests during early school years and it is not attributed to intellectual disabilities, or neurological or motor disorders. The difficulties should last for at least six months, to warrant a diagnosis [1].

The recommendations have been drafted for an age-range, based on current evidence. The diagnostic tool developed by the National Institute of Mental Health and Neurosciences (NIMHANS) for children with LD, is one of the recommended tools in India [5]. It includes two levels: Level-1 for children 5-7 years of age and Level-2 for children 8-12 years of age [5]. Hence, the recommendations pertain to children 5 years and above.

Prevalence: Approximately 5% of all students in public schools in the United States are identified as having LD [4]; while another study in US reported that 7% of children 3-17 years of age had LD [6]. The reported prevalence in India ranges from 1.6%-15%, varying based on age-range, survey method, tool used, and region of the country [7-10]. A cross-sectional study conducted in Chandigarh (n = 3600, grade 3 and 4 students) reported 3.08% of children with a diagnosis of LD [8]. Another study using informal assessment, conducted in five schools in Jaipur (n=1156, children 6-13 years of age) reported 12.8% with LD (21.6%, 15.5% and 22.3% of children with dyslexia, dyscalculia and dysgraphia, respectively) [9].

Types of Learning Disabilities

Dyslexia: Dyslexia or reading disability is a specific type of reading disorder caused by deficits in phonologic processing. These deficits are unexpected in relation to the student's overall intelligence and persist even after receiving appropriate (general educational) instruction. Dyslexia presents initially with problems in letter-sound relationships (*i.e.*, decoding words and reading fluently in kindergarten or grade one). Problems in reading comprehension usually present in the latter part of the primary school years, when the focus is on reading to learn rather than learning to read - these can be identified by low overall reading achievement, or by low reading ability, relative to overall intelligence.

Dysgraphia: Dysgraphia or writing disabilities are caused by a range of neurodevelopmental weaknesses, including problems with handwriting (fine motor or grapho-motor) and visual-spatial perception. Children present with difficulties in copying efficiently from the board; may show excessive grammar and punctuation errors; may produce overtly simple written text and/or produce disorganized text that is difficult to follow. In contrast, problems exclusively in spelling (also called 'encoding', which is the ability to use letter-sound relationships effectively) in absence of problems in written expression is more indicative of a phonologic processing deficit (*i.e.*, dyslexia), than a dysgraphia. Other problems include those in grammar and syntax as well as formulating, expressing and organizing ideas in writing.

Dyscalculia: Dyscalculia or mathematical disabilities may include problems with number sense, problems retrieving math facts (arithmetic combinations or calculations), difficulty with the language of math (correctly reading and understanding numbers and symbols), word problems in math (correctly reading and understanding the text of word problems) and the visual-spatial and organizational demands of math. Students may reverse numbers or make errors while reading them aloud. These problems are usually seen in conjunction with disabilities in reading or written expression. Math functions depend upon the ability of the student to understand words associated with arithmetic operations and word problems. Dyslexia can aggravate difficulties in acquiring math skills.

Co-morbid Conditions

These include Attention-deficit Hyperactivity Disorder (*i.e.*, inattention, hyperactivity, impulsivity, having difficulty sustaining focus, being disorganized); Autism Spectrum Disorder (*i.e.*, impairment in reciprocal social communication and social interaction; restricted repetitive patterns of behavior, interests or activities); Communication Disorders (*i.e.*, deficits in language, speech and communication) and Developmental Coordination Disorders (*i.e.*, impairment predominantly in gross and fine motor skills including handwriting skills, pedaling, buttoning shirts, completing puzzles, using zippers, playing ball games, etc.).

RECOMMENDATIONS

Diagnosis

The diagnosis of LD is made primarily by history. Diagnostic criteria and differential diagnoses (*e.g.* normal variations in academic achievement, ADHD, Intellectual disability, Learning disorders due to sensory or neurological impairments) have been provided in the DSM-5 [1]. These conditions can be differentiated by history, examination, laboratory tests (*e.g.* blood lead level), hearing and vision assessment, specialized screening/referral.

Psychometric tests help to confirm the presence of LD and identify targets for intervention. An appropriate assessment for LD includes information from student's educational history, a description of classroom observations and standardized psychometric measures.

LD can only be diagnosed after formal education starts, but can be diagnosed at any point afterward in children, adolescents, or adults, provided there is evidence of onset during the years of formal schooling. No single data source is sufficient for diagnosis. A mandatory vision and hearing assessment should be part of the protocol. Investigations for lead toxicity may be conducted, if suspected.

Assessments

Scales to diagnose LD take longer time to administer, which necessitates screening to identify 'at-risk' children. It is important to identify these children early, after school starts, for early intervention. Studies conducted in India to measure prevalence of LD have used screening questionnaires such as Specific Learning Disability-Screening Questionnaire (SLD-SQ) [8] or designed screening tools for class teachers to identify LD [10]. Pediatricians could use the SLD-SQ or focus on certain pointers in the latter to identify 'at-risk' children, in order to refer them for thorough evaluation by a developmental paediatrician. The pointers include: unexplainable absence from school, below average academic performance, poor writing ability, problems in reading ability, poor mathematical competence and problems in recall. Concerns in two or more of these areas, should warrant a referral [10].

The language availability, cost, diagnostic performance and time taken to administer a range of tests more suitable for Indian children, especially those who are first-generation English learners, have been summarized in ***Table* I** [5,11-15].

NIMHANS index to assess children with LD [5]. The index comprises of the following tests: (*a*) attention test (number cancellation); (*b*) visual-motor skills (Bender-Gestalt test and developmental test of visual-motor integration); (*c*) auditory and visual processing (discrimination and memory); (*d*) reading, writing, spelling and comprehension tests; (*e*) speech and language assessments including auditory behaviour (receptive language) and verbal expression; and (*f*) arithmetic tests (addition, subtraction, multiplication and division).

The Rehabilitation Council of India (RCI) recommends informal assessment (*i.e.*, parental interviewing after consent; gathering information from teacher/school; reviewing student's workbooks; and interviewing the child) and formal testing (*i.e.*, criterion and norm-referenced tests). Tests for LD have two components: (*a*) testing for potential performance discrepancy – where a two-year discrepancy between potential and performance is an indicator of possible LD and, (*b*) testing of processing abilities.

One or more tests have to be administered based on the child's age and cognitive ability. The range of tests that can be administered are as follows:

Intellectual assessment: Woodcock Johnson Tests of Cognitive Ability (3rd edition; age two and above) or Malin's Intelligence Scale for Indian Children (for children 6 years and above), which is the Indian adaptation of Wechsler Intelligence Scale for Children (WISC);

Achievement: Woodcock Johnson III – tests of Achievement for children; Nelson Denny Reading Test for high school and college students;

Cognitive Processing Abilities: Woodcock Johnson Psycho-Educational Battery Revised (Part 1 – tests of

TABLE I ASSESSMENTS FOR LEARNING DISABILITY

Name of the test/battery	*Age group/ grade*	*Cost*	*Note on diagnostic performance*	*Time taken*	*Available languages*
NIMHANS	Level I: 5-7 yr Level II: 8-12 yr	Freely available	Test-re-test reliability: 0.53 ($p< 0.001$)	Variable (battery of tests)	English, Hindi, Kannada
GLAD	6 yrs or older	Freely available	Test- re-test reliability: 0.68 for Grade IV to 0.99 for grade III; Criterion validity: 0.74 to 0.89	Variable (curriculum-based)	English, Hindi
BKT	3-22 yrs	INR 2000*	IQs correlate highly with measures on Stanford-Binet Intelligence Scales	2 hours	English; can be used with children not adequately exposed to English
WJ-III achievement	2 yrs and above	$2207*	Reliability: 0.81-0.94	60-70 minutes	English

**in January 2017; GLAD: Grade Level Assessment Device; BKT: Binet-Kamat test; NIMHANS: National Institute of Mental Health and Neurosciences.*

cognitive ability), Weschler Memory Scales Revised (age 16 years and above), Benton Visual Retention Test (age 8 years and above), Beery Visual-Motor Integration Test (age 2 years and above), Raven Colored Progressive Matrices (age 5 years and above) Rey Auditory-Verbal Learning Test (age ≥16 years), Bender Visual Motor Gestalt Test (age 4 years and above) and NIMHANS Index (Level I: 5-7 years and Level II: 8-12 years).

Assessment of intelligence is essential to exclude intellectual disability as a primary cause of difficulties in learning.

In a multi-linguistic country like India, it is important to develop scales to diagnose LD in non-English speaking students. As mentioned above, RCI has advised informal assessment for these students, in absence of standardized scales. Moreover, the Grade Level Assessment Device (GLAD) for children with learning problems in schools has been developed by the National Institute for the Mentally Handicapped (NIMH) [11].

It is essential to exclude other impairments as the primary cause of learning difficulties. Such impairments include low intellectual quotient; sensory deficits (visual and/ or hearing impairment); physical impairments; history of multiple education settings; poor educational background or lack of prior learning; and cultural differences contributing to lack of experience with the English language (*e.g.*, first-generation English learners). However, LD may co-exist with the above.

LD being a language-based disorder, it is imperative that tests for both receptive and expressive language be included in the comprehensive assessment. Other procedures include curriculum-based assessment; dynamic assessment; learning styles assessment and outcome-based assessment.

Intervention Approach

A basic intervention approach should focus on: a) interpretation of evaluation reports; b) description of specific skills that may be delayed (*e.g.*, phoneme awareness and phonics, reading comprehension, spelling instruction, number sense, and organizational skills), and c) identification of co-morbidities.

The intervention should be inter-disciplinary and individualized to each child. Required services include: developmental pediatrics evaluation; neurological evaluation; ophthalmology and audiology evaluation; clinical psychology assessment; occupational therapy (*e.g.*, handwriting, attention, hyperactivity, visual-motor coordination), remedial education (*i.e.*, educational assessment and individualized education program), counseling for family, and career-counselling.

Remedial education includes educational assessment of the child for strengths and weaknesses in academic skills; development of an individualized education program (IEP) for each child having short-term and long-term goals, and monitoring the child's progress. Intervention sessions (*i.e.*, twice- or thrice-weekly) could typically last for 45 minutes and continue for few years. Sessions could be offered in school or outside regular school hours. Parents need to be trained to adopt the strategies at home. Specific strategies include: (*a*) Review information about previous lesson on the topic before beginning the current lesson; (*b*) Clearly state what the student is expected to learn during the current lesson; (*c*) Describe how the student is expected to behave during the lesson *e.g.*, tell the child not to talk with peers if the assigned task is found to be difficult, but to raise his/ her hands to get the teacher's attention; (*d*) State all materials that the child will need during the lesson *e.g.*, specify that the child needs crayons, scissors and coloured paper for an art project rather than leaving the child to figure out the use of materials; (*d*) Psycho-educational interventions (*e.g.*, seating the child near the teacher to minimize classroom distractions), and (*e*) Assigning a specific teacher to review daily assignments.

Intervention Strategies

Phoneme awareness-Reading: During these sessions the child with dyslexia undergoes systematic and highly structured training exercises to learn that words can be segmented into smaller units of sound ('phoneme awareness'). During these sessions, the remedial teacher explicitly and directly teaches the following tasks: (*i*) Phoneme segmentation: *e.g.*, what sounds do you hear in the word pot? What is the last sound in the word tap?; (*ii*) Phoneme deletion: *e.g.*, What word would be left if the /m/ sound was taken away from mat?; (*iii*) Phoneme matching: *e.g.*, Do 'pen' and 'pipe' start with the same sound?; (*iv*) Phoneme counting: How many sounds do you hear in the word 'take'?; (*v*) Phoneme substitution: What word would you have if you changed the /p/ in pot to /h/?; (*vi*) Blending: What word would you have if you put these sounds together? /f/ /a/ /t/; (vii) Rhyming: Tell me as many words as you can that rhyme with the word eat.

Reading-Phonics instruction: Phonics instruction begins only after phonemic awareness gets developed. The child is taught that these sounds ("phonemes") are linked with specific letters and letter patterns ("phonics"). The goal of teaching phonics is to link the individual sounds to letters, and to make that process fluent and automatic for both reading and spelling. In other words, phonics teaches students symbol-to-sound and sound-to-symbol

linkages. Spellings are taught through 'phonics-based teaching' using colour-coded segmentation (*e.g.*, bot/tle), word formation games and sight-word identification. However, the English language has words like 'any', 'because', 'island', 'enough', etc. which are impossible to spell from the sounds of their letters. These tricky words can be learned *via* 'mnemonics'. However, even after years of adequate remedial education, subtle deficiencies in reading, writing, and mathematical abilities do persist in many children. To develop reading fluency and automaticity should be a critical intervention goal for older children.

Basic principles – writing skills: All of the components of writing need to be considered to create an intervention plan for addressing the components that are most affected. Lower-order writing skills consist of printing/ handwriting (transcription skills) and spelling skills (a phonics-based skill that requires sound-symbol relationships). Ultimately, the student should have memorized certain number of high-frequency words and spell them automatically (*i.e.*, writing fluency), without which higher-order skills are more difficult to master. Higher-order writing skills require the ability to write sentences (*e.g.*, understand language conventions related to punctuation, grammar, etc.) and produce a composition. Writing instruction involves drill and practice (explicit or direct instruction) of lower-order skills (transcription, spelling and writing fluency) in the service of higher-order skills (writing sentences and compositions). Direct instruction is required for the student to achieve accurate letter formation and fluency in writing, spelling, punctuation and grammar. Improvements in these lower-order skills can improve higher order performance. Specific types of instruction (*e.g.*, strategy instruction) can be used to improve performance in higher order writing skills.

Basic principles – Mathematics: Competence in mathematics depends upon mastery of lower-order skills which are then used in the service of higher order skills. In Mathematical disorder, primary deficits occur in number sense and math facts (arithmetic combinations or calculations). Performance in higher-order math skills also depends upon math fluency *i.e.*, the fluent application of number sense and math facts. Students with this disorder also have difficulty solving word problems. This can be due to problems in number sense and calculation skills or a coexistent reading or language disability. Thus, effective remediation for reading and writing disability has to be primarily worked upon. Finally, visual-spatial and organizational problems can interfere with success in mathematics, which requires occupational therapy intervention.

Specific areas where intervention should focus have been described below:

Number sense: Number sense refers to having mental representation of quantity (*i.e.*, ability to estimate and judge magnitude). It is an early-emerging skill that can fail to develop in students with Mathematical Disorder. Number sense is a prerequisite for math, and is a teachable skill. It can be compared to phonemic awareness, which is a prerequisite for reading (decoding), and is also a teachable skill. Number sense can be taught by (*a*) practicing identification or estimation of quantity (*i.e.*, less and more); (*b*) 1:1 correspondence (*e.g.*, correlating the number of coins being dropped into a box with the sound made by each of the coins, as it drops); (*c*) serial ordering (numbers are always counted in the same order); (*d*) "counting on" (*i.e.*, identifying changes in quantity by adding up from a smaller quantity to create a larger quantity); (*e*) showing the link between addition and subtraction while using objects; (*f*) using more than one type of visual representation for numbers (*e.g.* both horizontal and vertical number lines); and (*g*) other visual representations that show differences in size, volume, etc.

Mathematical facts or calculation skills: Number sense is required to understand how to add, subtract, multiply, and divide numbers. However, these skills are also acquired by learning the rules for addition, subtraction, multiplication, and division. The strategies used include efficient and effective counting-strategy use, mathematic fluency, mathematic vocabulary and word problems, visual-spatial skills in mathematics and organization and planning in mathematics. They are detailed in ***Web Box* 1**.

Provisions and Advocacy

Advocacy of the rights of children with LD to achieve optimal potential *via* provisions is a necessity. Pediatricians as trustees and custodians of children are the strongest voices that children have [16-18].

Presently, only few state governments (Maharashtra, Karnataka, Tamil Nadu, Kerala, Goa and Gujarat) and the National educational boards that conduct the Indian Certificate of Secondary Education and the Central Board of Secondary Education examinations have formally granted the benefit of availing the necessary provisions to children with LD [19]. Due to the central nervous system's higher plasticity in early years, remedial education should begin early when the child is in primary school [16-18].

The cornerstone of treatment of LD is thorough comprehensive evaluation and outcome-based, documented multidisciplinary intervention. Screening of all children at the age of 7 years for LD in the pediatric clinic will be highly beneficial (2-3 years after school exposure).

KEY MESSAGES

- Intervention approach should focus on interpretation of evaluation reports, description of specific skills that may be delayed and identification of co-morbidities.
- It is essential to have an inter-disciplinary approach involving different specialities; regular and concise documentation facilitates the process.
- The intervention should be inter-disciplinary and individualized to each child.
- Remedial education includes assessment of the child's academic strengths and weaknesses and development of an individual education program (IEP) having short-term and long-term goals and monitoring of the child's progress.

No Detention Policy (NDP) leads to delayed identification of learning problems, and needs to be seriously reviewed. Concept of multiple intelligence needs to be highlighted *i.e.*, students with LD can be poor in academic intelligence but may be better in other domains. Role of National Institute of Open Schooling is pertinent for children with LD in India [20].

LD lowers the scores of a student's performance and provisions are intended to function as a corrective lens, which will deflect the distorted array of observed scores back to where they ought to be. These provisions aim to 'level the playing field' for these students as their academic performance would now be matching with their intellectual potential [21-25].

Concessions for students with LD (all sub-types) include: (*a*) One hour or 25% extra time in public exams; (*b*) No mark reduction for grammar and spelling mistakes; (*c*) Use of calculator in Maths exam; (*d*) Exemption from writing one language exam; (*e*) Use of scribe or typing answers on a computer; and (*f*) 20% grace marks [21-25].

In terms of inclusion, the following policy-level changes are conducive for children with LD: (*a*) Government of India launched the *Sarva Shiksha Abhiyan* in 2001 ('Education for All') that aims to provide useful and relevant education to all children, including children with disabilities in the mainstream ('inclusive education') [26]; (*b*) Right of Children to Free and Compulsory Education 2009 (RTE Act) stresses on free and compulsory education for children 6 to 14 years of age, including children with special needs, and research has also looked at the challenges in its execution [27]; and (*c*) *Rashtriya Bal Swasthya Karyakram* (RBSK) focuses on early detection and intervention of disease, disabilities, deficiencies and developmental problems [28].

Previously, Learning Disability was not included in the Persons with Disability Act (PWD, 1995). The recent bill (Rights of Persons with Disability Bill 2011 and passed as an Act in 2016) has included LD and recognized it as a disability [25, 29].

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REFERENCES

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5®). 5th ed. Washington, DC: American Psychiatric Pub. 2013
2. Adelman HS. Opinion papers toward solving the problems of misidentification and limited intervention efficacy. J Learn Disabil.1989;22:608-12.
3. Adelman HS. LD: the next 25 years. J Learn Disabil. 1992;25:17-22.
4. Lyon GR. Learning disabilities. Future Child. 1996;6: 54-76.
5. Kapur M, John A, Rozario J, Oommen A. NIMHANS Index of Specific Learning Disabilities. Psychological Assessment of Children in the Clinical Setting. Department of Clinical Psychology, National Institute of Mental Health and Neurosciences; Bangalore. 2002:88-126.
6. Boyle CA, Boulet S, Schieve LA, Cohen RA, Blumberg SJ, Yeargin-Allsopp M, *et al*. Trends in the prevalence of developmental disabilities in US children, 1997–2008. Pediatrics. 2011;127:1034-42.
7. Mogasale VV, Patil VD, Patil NM, Mogasale V. Prevalence of specific learning disabilities among primary school children in a South Indian city. Indian J Pediatr. 2012;79:342-7.
8. Padhy SK, Goel S, Das SS, Sarkar S, Sharma V, Panigrahi M. Prevalence and patterns of learning disabilities in school children. Indian J Pediatr. 2016;83:300-6
9. Dhanda A, Jagawat T. Prevalence and pattern of learning disabilities in school children. Delhi Psychiatry Journal. 2013;6:386-90.
10. Arun P, Chavan BS, Bhargava R, Sharma A, Kaur J. Prevalence of specific developmental disorder of scholastic skill in school students in Chandigarh, India. Indian J Med Res. 2013;138:89.
11. Narayan J. Grade Level Assessment Device for Children with Learning Problems in Schools (GLAD). Secunderabad: National Institute for the Mentally Handicapped

(NIMH); 1997.
12. Kamat VV. A revision of the Binet scale for Indian children:(Kanarese and Marathi speaking). Br J Educ Psychol. 1934;4:296-309.
13. Woodcock RW, McGrew KS, Mather N, Schrank F. Woodcock-Johnson III NU tests of achievement. Rolling Meadows, IL: Riverside Publishing. 2001.
14. Panicker AS, Bhattacharya S, Hirisave U, Nalini NR. Reliability and validity of the NIMHANS Index of Specific Learning Disabilities. Indian J. Mental Health. 2015;2:175-81.
15. Malhotra S, Rajender G, Sharma V, Singh TB. Efficacy of cognitive retraining techniques in children with learning disability. Delhi Psychiatry J. 2009;12:100-6.
16. Lagae L. Learning disabilities: definition, epidemiology, diagnosis and intervention strategies. Pediatr Clin North Am. 2008;55:1259-68.
17. Shaywitx SE. Dyslexia. N Engl J Med. 1998;338:307-12.
18. Karande S, Kulkarni M. Specific learning disability: the invisible handicap. Indian Pediatr. 2005;42:315-9.
19. Karande S, Gogtay NJ. Specific learning disability and the right to education 2009 act: Call for action. J Postgrad Med. 2010;56:171-2.
20. Singal N. Inclusive education in India: International concept, national interpretation. Int J Disabil Dev Ed. 2006;53:351-69.
21. McDonnell L, LcLaughlin M, Morison P. Educating one and all: students with disabilities and standards-based reform. National Academy Press; Washington DC: 1997. p. 204.
22. Sandhu P. Legislation and the current provisions for specific learning disability in India-Some observations. Journal of Disability Studies. 2016;1:85-8.
23. National Joint Committee on Learning Disabilities. Providing appropriate education for students with learning disabilities in regular education classrooms. J Learn Disabil. 1993;26:330-2.
24. Hammill DD. On defining learning disabilities: an emerging consensus. J Learn Disabil. 1990;23:74-84.
25. Unni JC. Specific learning disability and the amended "persons with disability act". Indian Pediatr. 2012;49: 445-7.
26. Kainth GS. A mission approach to Sarva Shiksha Abhiyan. Econ Polit Wkly. 2006;41:3288-91.
27. Mehrotra S. The cost and financing of the right to education in India: Can we fill the financing gap? Int J Educ Dev. 2012;32:65-71.
28. Operational Guidelines on Rashtriya Bal Swasthya Karyakram (RSBK). Ministry of Health and Family Welfare, Government of India. Available from: *http://www.pbnrhm.org/docs/rbskguidelines.pdf.* Accessed January 13, 2017.
29. Kamala R. Specific learning disabilities in India: Rights, issues and challenges. Indian J Appl Res. 2014; 4(5). Available from: *https://www.worldwidejournals.com indian-journal-of-applied-research-(IJAR)/file.php?val=May_2014_1398967503_e9548_190.pdf.* Accessed January 13, 2017.

ANNEXURE I

Participants of the National Consultative Meet for Development of IAP National Consensus Guidelines on Neuro Developmental Disorders.

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Invited but could not attend the meeting: MKC Nair, Thrissur; Pratibha Singhi, Chandigarh; Jeeson Unni, Cochin; Manoj Bhatvadekar, Mumbai.

WEB BOX 1 EXAMPLES OF INTERVENTIONS FOR MATHEMATICAL DISORDERS

Efficient and effective counting-strategy use: Counting strategies need to be taught explicitly alongside number facts. Students with Mathematical Disorder may not develop their own strategic learning. For example, they may not learn that "counting upward" from the larger addend (addend is a number that is added to another) can save time when doing addition problems (e.g. 5 + 4 = 9 is easier to understand than 4 + 5 = 9). Counting strategies can help develop both number sense and arithmetic combination skills. *Gradually*, students develop memory-based retrieval of answers, increasing their overall efficiency.

Mathematical fluency: Students have difficulties completing higher order Mathematical problems when they have not yet developed automaticity in basic arithmetic combinations and cannot retrieve memorized answers to basic arithmetic combinations quickly. Remediation is crucial at the beginning of third grade. Rote learning and memorization alone are not as effective as the combination of memorization with strategy instruction.

Mathematical vocabulary: Students have difficulties with the language of Mathematical. They may reverse numbers, or make errors when reading numbers aloud. Confusion about number symbols and signs is a distinguishing characteristic. In math, there are no context clues to help students decipher terms that they may not understand. The language of math must be taught directly and explicitly, not incidentally.

Word problems: Reading difficulties can aggravate difficulties in acquiring Mathematical skills. Students with reading and Mathematical difficulties, have greater difficulty with word problems than students with isolated Mathematical Disorder. They also have greater difficulty in understanding the meaning of the sentences describing the problem, understanding what the problem is asking and identifying extraneous or irrelevant information. General strategy instruction may be helpful in solving word problems.

Visual-spatial skills in Mathematical: Students may copy numbers incorrectly, write numbers illegibly, misalign numbers, have left-right disorientation of numbers, misplace digits in multi-digit numbers, skip rows or columns during calculations, fail to carry numbers (e.g., regrouping when appropriate), reverse number problems, start a calculation in the wrong place, or may not recognize operator signs. The use of lined or graph paper, or specific strategy instruction is effective. Visual-spatial weaknesses can also affect the student's understanding of volume and Mathematical problems in geometry.

Organization and planning in Mathematical: Due to planning and organizing difficulties, students may fail to verify answers and settle for the first answer they reach. Strategy instruction can help the student to follow a prescribed sequence when solving problems; check solutions using a computer; or prompt him/her to ask if the answer is a reasonable one.