

DEVELOPMENTAL DISORDERS
EARLY IDENTIFICATION AND INTERVENTION
[MULTIDISCIPLINARY APPROACH]

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MARCH 2000

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INTRODUCTION TO THE NATURE OF DEVELOPMENTAL DISORDERS AND IMPLICATIONS FOR POLICY DECISION MAKING

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Restricted Definition of Disabilities: A Major Problem in Early Detection and Management of Developmental Disorders in India

While considering disabilities for the purpose of Special Education in our country mainly the following categories are considered.

- (a) Sensory Impairments - Auditory and Visual Disabilities
- (b) Mental retardation
- (c) Physical handicapping conditions
 - Cerebral palsy
 - Orthopaedic handicap
(problems of bones, joints and muscles)

The National Policy on Education 1986, Programme of Action 1992 has concentrated only on the above categories for the purpose of Special Education in segregated and integrated set up. The Rehabilitation Council of India Act, 1992 (Ministry of Welfare, Government of India) also has a restricted definition of handicap. As per this act "handicapped" means a person with visual handicap, hearing handicap, locomotor disability or mental retardation.

The Persons with Disabilities (equal opportunities, protection of rights and full participation) Act, 1995 is an Act to give effect to the proclamation on the full participation and equality of the people with Disabilities in the Asian and Pacific Region (Legislative Department, Ministry of Law, Justice and Company Affairs, Government of India). Act also defines disability as

- (i) blindness
- (ii) low vision
- (iii) hearing impairment
- (iv) locomotor disability
- (v) leprosy-cured
- (vi) mental retardation
- (vii) mental illness (any mental disorder other than mental retardation)

The above definitions reveal that the provision for variety of services are limited to individuals with only certain types of disabilities. The above policies and acts have not considered other disabilities which also pose equal or even more challenge for intervention/management like learning disabilities, autism, attention-deficit/hyperactivity disorders, conduct disorders and other emotional and

behavioural problems. This has posed lot of problems in prevention, early detection and intervention/management of these types of problems. With proper knowledge and understanding of the nature, causes of different types of disabilities and intervention strategies it is not only possible to help the children with the disabilities to function well in different aspects of life, but, it is also possible to prevent most of these disabilities. Somehow the present policies and Acts mentioned above have not given priority to the preventive aspect of management. The importance of the slogan 'Prevention is better than cure' is not understood and put into practice. Preventive measures are possible only when almost all the types of problems noticed during developmental period (infancy, childhood and adolescence) are taken into consideration while framing policies. Though the existing Policies/Acts related to disabilities are excellent, they are inadequate as far as the inclusion of all sorts of target groups are considered. While developed and developing countries are doing excellent work or have taken initiation in this line, it is high-time in India also to take initiation in extending essential services to individuals with all disabilities and in improving the existing services for some categories of disabled children. This calls for a sound scientific knowledge about the disabilities on the part of different personnel involved in policy making. The papers included in the book provide basic knowledge relating to some disabilities and advanced knowledge about certain other kinds of Developmental Disorders/ Disabilities.

Types of Developmental Disorders

While considering the nature and types of Developmental Disorders World Health Organisation's International Classification of Diseases and Related Health Problems (ICD-10, 1992) and the Diagnostic Statistical Manual of DSM-III (1980), DSM-III R (1987) and DSM-IV (1994) of American Psychiatric Association are usually kept as the basis. In the present book also ICD-10 (1992) and DSM-IV (1994) have been considered as the basis. Most of the papers of this book have made a mention of these bases. According to these systems and documents Developmental Disorders/Disabilities are the disorders which are usually first diagnosed in infancy, childhood or adolescence. The subcategories included under this major category are:

- (a) Mental Retardation
- (b) Learning Disorders (Academic Skills Disorders)
- (c) Motor Skills Disorder
- (d) Pervasive Developmental Disorders
- (e) Disruptive Behaviour and Attention Deficit Disorders
- (f) Feeding and Eating Disorders of Infancy
- (g) Early Childhood
- (h) Tic Disorder
- (i) Communication Disorders
- (j) Elimination Disorders
- (k) Other Disorders of Infancy, Childhood or Adolescence

Each of these subcategories have different kinds of disorders/disabilities. The papers of the book discuss the nature, indicators for identification and diagnosis, broader approaches/strategies for intervention and management. The focus is also on suggesting preventive measures. Though Epileptic Syndrome is not considered as a separate set of disorder in ICD it may exist in isolation in some children or may co-exist with other developmental disorders such as mental retardation, cerebral palsy, autism, etc. That's why a separate paper is included on this book particularly for the benefit of paediatricians. The points discussed in various papers of this book have significant implications on pre-school education as well as school education. Education whether in integrated or segregated set up should be based on the true nature of the developmental disorders and a wide variety of Intervention Strategies (Medical, Psycho-Social-emotional, psycho-educational, etc.) and involvement of specialists from various disciplines and establishment of multi-speciality centres for these types of children throughout the country at least in the beginning in every district headquarters. Though there are centrally sponsored schemes like Early Childhood Care and Education with ICDS, ECE, Balwadis and day-care centres, pre-primary schools, maternal and child health services, the personnel involved with the implementation of them are not provided with the knowledge and skills in preventive or corrective measures.

Unless the existing Policies and Acts relating to disabilities accommodate all these disabilities under their purview and make provision for essential services to all the children with these disabilities, it is impossible to achieve various goals set under medical, psychological or educational services.

The Commonwealth Association for Mental Handicap and Developmental Disabilities (CAMHADD) and Association for Prevention of Disabilities (Prevention International) have given utmost priority to primary prevention (removal of the cause of the disability), secondary prevention (early detection of disease or disorder before symptom or disordered function appear) and Tertiary prevention (management of established disease to avoid or limit the development of a disability and its consequent handicap). The CAMHADD Pan-Commonwealth Workshop on 'Early Intervention for Pre-school Children in Developing Countries' have given very pertinent and valuable recommendations for achieving the above goals. They are very relevant in the present Indian scenario. These aspects are discussed in the document prepared by Pandurangi V.R. and Wood A. Peter (1991), Proceedings of CAMHADD Pan-Commonwealth Workshop held at Maldives 30 Jan-7 Feb 1990. This document can be considered as a valuable source for suggestions in the efforts for helping children with Developmental Disorders.

AUTISM: SPECIFIC DIFFICULTIES IN DIFFERENT ASPECTS OF DEVELOPMENT AND MAJOR APPROACHES FOR INTERVENTION

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Introduction

Autism is a perplexing life-long mental handicap. Autism is a wide umbrella term. Children with autism have different levels of intelligence. However all of them share certain common characteristics.

The 10th revision of the World Health Organisation's International Classification of Diseases and Related Health Problems (ICD-10), 1992 and the American Psychiatric Association's Diagnostic Statistical manuals DSM-III (1980), DSM-III-R (1987) and DSM-IV (1994) included autism under Pervasive Developmental Disorders. In DSM-III-R Pervasive Developmental Disorders are treated as a subcategory under -Developmental Disorders whereas in DSM-IV (1994) they are included under the majority category - Disorders of Psychological Development. Pervasive Developmental Disorders imply deviance rather than delay in development, although they involve some degree of delay (DSM-IV, 1994).

Diagnostic Criteria for Autism

Nearly 75% of autistics have mental retardation of different degrees. It is difficult to distinguish a child with autism and mental retardation, from a mentally retarded child who is not autistic. Certain sets of criteria are essential for diagnosing autism. DSM-IV has given a set of criteria for identification of children with autism. They are given in the table. [Source: Tom E.C. Smith et al. (1998), Teaching Students with Special Needs in Inclusive Settings, Allyn and Bacon]

Problems and Identification

Just as autism is hard to define, children with autism are difficult to identify, problems related to the identification of these children include the following. (Tom E.C. Smith et al., 1998).

- Children with autism display many characteristics exhibited by individuals with other disabilities, such as speech and language disorders.
- Many children with autism, because they exhibit disorders across multiple domains, are mistakenly classified as multihandicapped.
- No stable classification system is used among educators and other professionals who encounter children with autism (Eaves, 1992).
- Still another problem in identifying children with autism is the large, diverse group of professionals involved in the evaluation and diagnosis. In diagnosing some disabilities, educators function as the lead professionals; in the area of autism, paediatricians, speech-language pathologists, psychologists, audiologists,

and social workers are typically involved as well (Powers, 1989). Working with such a large group of individuals can cause difficult logistical problems. Diverse definitions and eligibility criteria, different funding agencies, and varying services complicate the process of identifying and serving these children and adults.

This suggests that there should be consensus among various professionals dealing with autism as far as the diagnostic criteria of individuals with autism.

A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):

- (1) qualitative impairment in social interaction, as manifested by at least two of the following:
 - (a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
 - (b) failure to develop peer relationships appropriate to developmental level
 - (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
 - (d) lack of social or emotional reciprocity
 - (2) qualitative impairments in communication as manifested by at least one of the following:
 - (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
 - (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
 - (c) stereotyped and repetitive use of language or idiosyncratic language
 - (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
 - (3) restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:
 - (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 - (b) apparently inflexible adherence to specific, nonfunctional routines or rituals
 - (c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
 - (d) persistent preoccupation with parts of objects
- B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.
- C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder (two pervasive developmental disorders characterized by impairment in the development of reciprocal social interaction).

Specific Difficulties Experienced by Children with Autism

The knowledge of specific difficulties experienced by individuals with autism is helpful in planning intervention program for them. The Association of Head Teachers of Autistic Children and Adults (1985), UK, has described the specific difficulties of children with autism in detail.

Impaired Relationships and Self Image

a) Lack of self image

- Suffers a lack of personal identity and an impairment of his own self image.
- He is "asocial" tending to remain isolated, occupying himself with his own obsessional or ritualistic activity, and having an impaired sense of his own appropriate personal territory.
- Being unaware of himself, his actions and his effect on others, he is likely to display a lack of inhibition in his general behaviour.

b) Difficulty in relating to other people

- Impairment of the awareness of other people and their needs.
- An inappropriate social response to, and communication with others.
- An impairment of the ability to recognise human characteristics.

c) Difficulty in perception of meaningful relationships

- Impaired ability to see sequences of growth, time, action, etc.
- Impaired ability to see similarities or differences, like and unlike.
- Impaired ability to see a whole picture or a whole of anything.
- Impaired ability to relate properties, eg. fire will burn.
- Impaired ability to generalise or transfer learning.
- Lack of awareness of the reality of what cannot be seen, and an impaired ability to separate reality from fantasy.
- Impaired awareness of the relationship of objects to each other, to themselves, and to other people, eg. as seen in an inability to comprehend the use of prepositions.
- Lack of judgement.
- Inability to be selective in the processing of information.

d. Difficulty in relating to outside stimuli

- Impairment of motivation lacking the desire to learn new skills and the desire to please.
- Impairment of the sense of touch, smell, taste.
- Impairment of the use of sight where he may be fascinated by visual stimuli such as lights or bright objects, and be uninterested in the rest of his environment.
- Inappropriate reaction to sounds.
- Inappropriate emotional response.
- Lack of awareness of real danger and a phobic response to harmless objects.
- Lack of awareness of cause and effect.
- Inappropriate reaction to change.

Deficiency in Adoptive Behaviours

- a. Ritualistic, compulsive, obsessional behaviours.
- b. Extreme irrational fears or phobias.
- c. Rigidity of thought and action - This manifests itself in pre-occupation with sameness and difficulty with change.
- d. Poor perception of reality - There is often confusion between inner and outer worlds.
- e. Extreme Anxiety States, or "High Arousal".

Impaired Language and Communication Skills

- a. Difficulty in language.
- b. Patchy development of skills - No normal development of cognitive skills. Having a particular skill does not imply that 'earlier' skills will be present.
- c. Specific difficulties in problem solving.
- d. Play may be stuck at early stages of development.
- e. Tend to have poor imitation skills.
- f. Difficulty in directing attention to certain meaningful features of the environment.
- g. Motivation and self-directed action are often lacking.
- h. Time and causality are difficult ideas to autistic children.
- i. Poor sequencing ability.

Deficiency in perceptual-motor skills

- Lack of body awareness, body control and perceptual control.

On the basis of the specific difficulties discussed above (Ramaa, 1998), autism has considered this a complex learning disorder in her book *Autism: A Complex Learning Disorder - A Multi-Disciplinary Perspective*. In order to help children with autism a multidisciplinary approach is essential. The specialists from the field of psychiatry, paediatrics, clinical psychology, special education, physiotherapy and occupational therapy, speech and language therapy should plan a well co-ordinated programme for helping them. Autism is viewed from different disciplinary point of view in isolation. But for planning and executing intervention programme there is a need to understand autism from multidisciplinary perspective. Hence an attempt has been made by Ramaa (1998) in her book in this line. The etiological factors are not discussed in this paper. Only major approaches for intervention are highlighted.

Davidson and Neale (1994)^{1*} have discussed some treatment procedures. A brief account of them is given below.

Treatment of Autistic Disorder

If the children with autism are identified early educational programs will be useful. Educational programs for autistic children usually try to relieve their symptoms and improve their communication, social skills and adoptive behaviour so

* Davidson C. Gerald and Neale M. John (1994). *Abnormal Psychology*, Sixth Edition, John Wiley Sons, Inc.

that they can become more independent. But teaching autistic children poses several problems. Some of the important of the problems are as follows:

- (a) Autistic children do not adjust normally to changes in routines, efforts to teach necessarily involve such changes.
- (b) Their behaviour problems and self-stimulatory movements may interfere with effective teaching. Though the similar problem behaviour of children with other disabilities may be corrected/reduced because of the teacher's efforts, they may not be so effective in the case of autistic children with the same frequency and severity.
- (c) It is very difficult to find reinforcers that motivate autistic children. Normal children like to explore and control their surroundings, but not children with autism. If the reinforcers have to be effective with autistic children, they must be explicit, concrete or highly salient. The social reinforcement should be linked with primary reinforcers, such as food. The over-selectivity of attention interferes with the learning of autistic children. When the child's attention becomes focused on one particular aspect of a task or situation, other properties may not even be noticed however important and relevant they are. The overselective nature of autistic children's attention makes generalisation of learning especially difficult for them. The child's response may be contingent on a non-essential aspect of the situation, which is usually not present in other contexts. For example, the child who is learning concepts by focusing attention only on one aspect like colour/size/shape may not identify the same objects when they above attributed are changed.

In spite of all these problems, well planned educational programs for pupils with autism have proved some success.

Behavioural Treatments

Mental health professionals support the importance of modelling and operant conditioning in helping children with autism. Behaviour therapy helped the autistic children to talk, modify their echolalic speech, encourage them to play with other children and to become more generally responsive to adults.

Like mental retardation, autism also causes stress on a family. As autistic children have few or no physical disabilities and some isolated normal and superior abilities, their parents will not be in a mental set to accept the diagnosis. Parents should be informed about the time nature of autistic disorder and should be relieved of their tension due to guilt feeling by removing the false belief from their mind that autism has psychogenic cause. Parents have to be counselled properly in this regard. The education provided by parents is more beneficial to the child than a clinic or hospital based treatment. Parents have to be trained adequately in helping their autistic children.

Drug Treatment

The most commonly used medication for autistic behaviour is haloperidol, an antipsychotic medication. However, many autistic children do not respond positively

to this drug. This supports the theory that autism is different from early-onset Schizophrenia. Haloperidol was also proved to potential side effects.

There is some evidence that autistic children have elevated blood levels of serotonin. However studies involving the use of fenfluramine, a drug known to lower serotonin levels showed that serious negative side effects like excessive sedation, increased irritability, and transmit weight loss have caused concern among the practitioners. Researchers are needed in this line.

Some studies which involved an opioid receptor antagonist, naltrexone, reduced self-injurious behaviour, hyperactivity and attention deficit and also the severity of autistic behaviours. However more controlled studies are required to prove the effectiveness of this medicine.

References

- Davison C. Gerald and Neale M. John (1994). *Abnormal Psychology*, Sixth Edition, John Wiley and Sons, Inc.
- Ramaa, S. (1998). *Autism: A Complex Learning Disorder - A Multidisciplinary Perspective*, Regency Publications.
- Smith E.C. Tom et al. (1998). *Teaching Students with Special Needs in Inclusive Settings*, Allyn and Bacon.

LEARNING DISORDERS: NATURE, ETIOLOGY AND IMPLICATIONS FOR INTERVENTION

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Learning Disorders/Disabilities - Concept

Learning Disabilities Association of Canada, 1996 has identified the following important features of this disorder

1. Learning disabilities (disorders) is a generic term that refers to a heterogeneous group of disorder due to identifiable or inferred central nervous system dysfunction.
2. Such disorders may be manifested by delays in early development and/or difficulties in any of the following areas.
3. Attention, memory, reasoning, co-ordination, communicating, reading, writing, spelling, calculation, social competence and emotional maturation.
4. Learning disabilities are intrinsic to the individual, and may affect learning and behaviour of any individual, including those with potentially average, or above average intelligence.
5. Learning disabilities are not due primarily to visual, hearing, or motor handicaps, to mental retardation emotional disturbance, or environmental disadvantage, although they may occur concurrently with any of these.
6. Learning disabilities may arise from generic variations, bio-chemical factors, events in the pre to perinatal period or any other subsequent events resulting in neurological impairment.

Types and Subtypes of Learning Disorders

The 10th revision of the WHO's International Classification of Diseases and Related Health Problems (ICD-10) and the American Psychiatric Association's Diagnostic Statistical Manuals DSM-III (1980), DSM-III (1987) and DSM-IV (1994) use different terms and classification of this disorder. Both of them consider learning disorder under the main classification disorders usually first evident in infancy, childhood or adolescence.

They use Multiaxial System as follows.

Axis I	Clinical Syndromes
II	Developmental Disorders and Personality Disorders
III	Physical Disorders and Conditions
IV	Severity of Psychosocial Stressors
V	Global Assessment of Functioning

DSM-III (1987) uses the term Academic Skills Disorders and include under the Axis-II.

DSM-IV (1994)

- Does not use the term learning disabilities
- Learning disorders includes - learning disorders of academic skills, communication disorders, and motor skills disorders included in this manual
- Female and Male ratio 2 to 4 times more common in male than in female
- LD - affects academic and social development.

DSM-IV - Classification

Learning Disorders (academic skills disorders) -reading disorder, mathematics disorders, and disorder of written expression.

In the paper learning disorders include all the three types.

Difficulties Experienced by Children with Learning Disorders Reading disorder (dyslexia)

Difficulties are experienced in word recognition, reading comprehension and written spelling. Two to eight per cent of school age children have this problem.

Mathematics disorder: Difficulties in the following skills are noticed

Linguistic skills - such as coding written problems into mathematical symbols.

Perceptual skills - recognising numerical symbols.

Attention skills - remembering the rules.

Mathematical skills - different operations.

As common as reading disorder and spelling and often the three overlap.

Disorder of Written Expression

An impairment in the ability to compose the written word - spelling errors, grammatical or punctuation errors or poor paragraph organisation.

Communication Disorders

Receptive language disorder - Understanding spoken language - may be considered deaf.

Expressive language disorder (expression through speech) may seem eager to communicate but have difficulty finding the right words.

- By age four, the child speaks only in short phrases -delay.
- Old words are forgotten when new ones are learned.
- Below average ability in the use of grammatical structures.

Phonological disorder - No problem in comprehension and vocabulary.

- Words sound like baby talk.
- Not learned articulation of the later acquired speech sound - r, sh, tn, f, z,l and ck.
- Speech therapy is very effective.
- Milder cases may recover spontaneously by age eight.

Motor skills disorder (Developmental co-ordination disorder)

- Marked impairment in the development of motor co-ordination which cannot be attributed to mental retardation or cerebral palsy
- Delay or difficulty in age appropriate motor skills.

- Go undetected unless affect academic or daily activities -Has lot of educational implications.

Symptomology Checklist - Learning Disabilities

(Check behaviours seen, Mark: S = Sometimes; O = Often)

Visual Perceptual Deficits

- reversals: b for d, p for q
- inversions: u for n, w for m
- yawns while reading
- complains eyes hurt, itch/rubs eyes
- complains print blurs while reading
- turns head or paper at odd angles
- closes one eye while working
- cannot copy accurately
- loses place frequently
- rereads lines/skips lines
- does not recognise an object/word if only part of it is shown
- reading improves with larger print/fewer items on page/ uses a marker to exclude portion of page
- sequencing errors: was/saw, on/no
- does not see main theme in a picture, picks up some minute detail
- slow to pick up on likenesses-differences in words; changes in environment
- erases excessively
- distortions in depth perception

Visual Perceptual/Visual Motor Deficits

- letters collide with each other/no space between words
- letters not on line
- forms letters in strange way
- mirror writing (hold paper upto mirror and you see it as it should look)
- cannot colour within lines
- illegible handwriting
- holds pencil too rightly; often breaks pencil point/ crayons
- cannot cut
- cannot paste
- messy papers

Auditory Perceptual Deficits

- auditory processing; cannot understand conversation or learning delivered at the normal rate/may comprehend if information is repeated very slowly
- auditory discrimination; does not hear differences in sounds; short, i.e. plosive sounds
- cannot tell direction sound is coming from

- does not recognise common sounds for what they are
- cannot filter out extraneous noise; cannot distinguish teacher's voice from others - hears wrong answers, steadfastly maintains "teacher said it" (some children get very tense in noisy classroom)
- does not follow directions
- does not benefit from oral instruction

Spatial Relationships and Body Awareness Deficits

- gets lost even in familiar surroundings such as school, neighbourhood
- directionality problems, does not always read or write left to right
- no space between words
- cannot keep columns straight in math
- bums into things; clumsy, accident prone
- does not understand concepts such as over, under, around, through, first, last, front, back, up, down

Conceptual Deficits

- cannot read social situations, does not understand body language
- cannot see relationship between similar concepts
- cannot compare how things are alike/different; classification activities are difficult
- does not understand time relationships - yesterday, today, tomorrow, after, before, 15 minutes versus 2 hours, "hurry"
- does not associate an act with its logical consequence
- little imagination
- no sense of humour; cannot recognise a joke/fun
- tends to be expressionless
- slow responses
- not able to create, to "think", to create poetry, original stories
- cannot make closure; cannot read less than clear ditto; cannot finish a sentence such as "I like it when ..."; difficulty filling in blanks
- excessively gullible
- cannot do inferential thinking: What might happen next? Why did this happen?
- great difficulty in writing
- bizarre answers/or correct answers found in bizarre ways
- cannot think in an orderly, logical way
- does not understand emotions, concepts such as beauty, bravery
- classroom comments are often "off track" or reasons in bizarre ways
- difficulty grasping number concepts: more/less; >/<; can't estimate
- mispronounces common words

Memory Deficits

- cannot remember what was just seen (was shown)

- cannot remember what was just heard
- cannot remember sequence of 4 numbers given auditorally
- cannot copy maths problems accurately
- cannot remember spelling for common/frequently encountered words
- remembers things from long ago but not recent years
- poor sight vocabulary - few words known to automatic level
- slow to memorise rhymes/poem (makes many errors)
- appears to know something one day but doesn't know it the next
- limited expressive language; does not remember names for objects - "that thing"
- limited receptive language
- makes same error again and again; does not seem to benefit from experience
- writing poor - cannot remember to capitalise, punctuate, skip a line, indent, and so on

Motor Output Deficits

- perseveration - gives same response again and again (hands up)
- distortions in gross motor functions - cannot skip, hop, hit ball, and so on
- difficulty cutting, pasting, colouring, writing (can point to correct way to form a letter but cannot produce it on paper)
- can point to correct spelling but cannot copy it accurately
- can dictate story or paragraph but cannot write it
- does not communicate orally to a degree appropriate for age
- mouth noises
- ties

Behavioural Components

Attention deficit disorder

- good days - bad days
- cannot sit still
- cannot stand still
- impulsive; does not consider consequence before acting
- low frustration tolerance; short fuse
- cannot finish assignments in allotted time
- visually distractible; looks up to all visual stimuli
- auditorally distractible; responds by looking up to all noise
- fidgety: drumming fingers, tapping toes, rolling pencil, fooling with objects; makes mouth noises; incessant talking
- short attention span
- spaces off - confused - does not sit up/head on desk/ "tired"
- negativistic/oppositional behaviour
- little work produced; daydreams

- reads something correctly, but mind is elsewhere as evidenced in poor comprehension
- overreacts to stimuli (cannot mind own business)
- does not follow rules; often claims didn't hear them
- may be cruel, mean to others; makes fun of them
- mood swings
- disorganised; loses books; papers, lunch box, coat

Failure syndrome

- describes self as "dumb"
- does not take reprimands well
- tends to avoid group activity
- avoids activity; does little; claims illness
- daydreams/withdrawal
- class down - acting out behaviour
- immature behaviour; babyish, seems younger, dependent

Serious emotional overlay

- explosive, unpredictable, dangerous behaviour, lashing out
- preoccupation with death, destruction; prefers dark colours and red, purple, yellow
- no work produced coupled with lack of enthusiasm for anything
- tells bizarre stories and purports they really happened
- shallow feeling for others
- cannot distinguish reality from fantasy
- withdraws; alone; little communication
- feels "picked on"; uses projection denial; never assumes responsibility for actions
- fearful, anxious, insecure, tense

(Source: Joan M. Harwell, Complete Learning Handbook)

Associated Deficiencies

A. Neuropsychological processes

1. Motor problems > Inadequate co-ordination poor tactile kinesthetic discrimination.
2. Visual perceptual problems
3. Auditory perceptual problems
4. Association skills
5. Orientation problems - time, spatial organisation, basic concepts

B. Delay in cognitive development > Conservation, seriation, classification tasks.

C. Deficiencies in cognitive and metacognitive components.

D. Language deficiencies

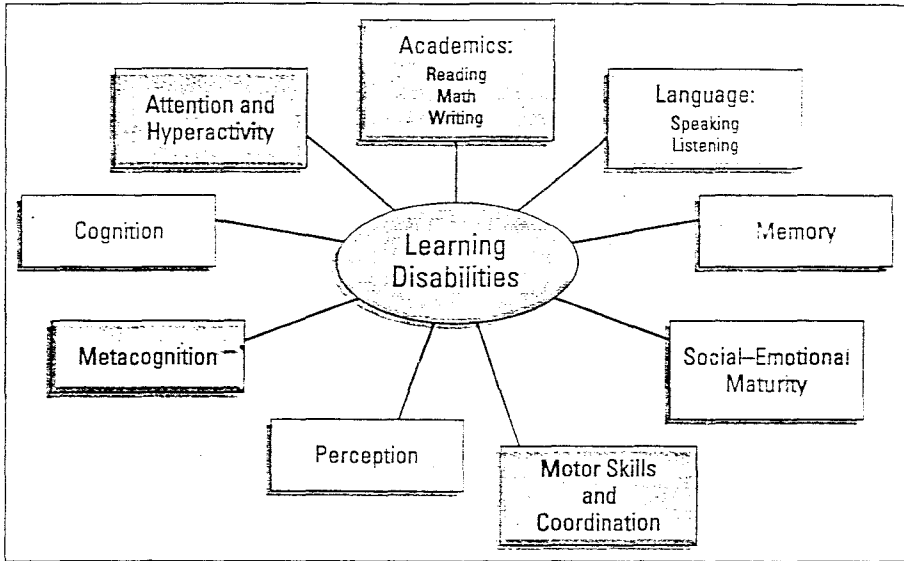
E. Deficiencies in mathematical abilities

F. Social skills

G. Co-morbid disorders > ADD/HD, lack of motivation, conduct disorders.

H. Psychiatric problems > Depression, poor interpersonal relationships, self-blame, low self-esteem, anxiety, aggressiveness, psychosomatic problems - headaches, fatigue, gastrointestinal discomfort.

Areas of Possible Strengths and Deficits of Students with Learning Disabilities



(Source: Smith et al. (1998), Teaching Students with Special Needs in Inclusive Settings, Allyn and Bacon)

Etiology of Learning Disorders

- Both biological and psychological factors are possible causes of severe learning disabilities.

Biological Factors .

I. Neurological bases and Dyslexia

Variety of approaches

1. Behavioural psychometric approach - Cognitive abilities of the dyslexics are assessed - invariably poor in semantic linguistic tasks.
 - neurological substrata inferred
 - performance of dyslexics resemble brain damaged > minimal brain damage
2. Direct approaches through various recent techniques -post-mortem, computerised tomography (CT), sonography, EEG, MRI, magneto-encephalography, etc.

Major Findings

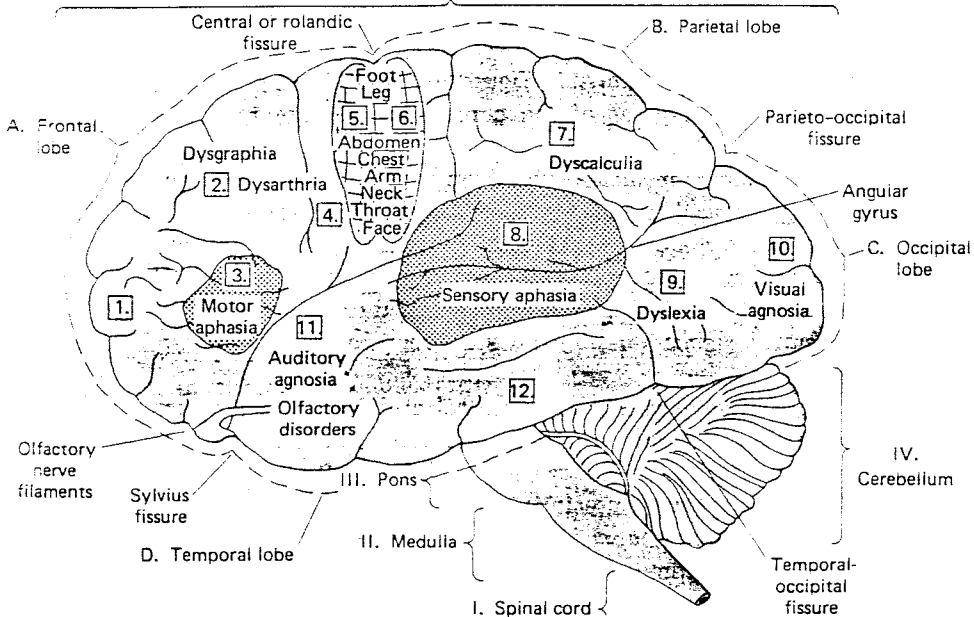
1. No gross brain pathology - developmental disability.

2. Difference in symmetry - right handed dyslexics normal asymmetry between both the hemispheres. Left-handed or severely language delayed may have normal asymmetry, or symmetrical posterior cortex or reversed occipital asymmetries (right lobe larger than left).
3. Microscopic abnormalities in the location, number and organisation of neurons. The anomalies were predominant in the left hemispheric language regions (Galaburda, 1979). Sources of these developmental defects not known.
4. No difference in electrical activity at rest between dyslexics and nondisabled.
5. During reading and listening tasks the brains of dyslexics showed less appropriate electrical activity in the regions hypothesised to be related to reading (ERP's event related potentials).
6. Left more than right physiologic dysfunction in dyslexics During reading tasks, altered patterns of cerebral blood flow in the left posterior temporal parietal region.
7. Neurodevelopmental anomalies in regions of the cortex known to be important in visual imagery, cross-modal integration and visual and auditory association.
8. More involvement of the anterior cortex over the posterior cortex; left more than right.
9. Right hemisphere may also be involved in some subtypes of behavioural or developmental learning disorders including dyslexia.
10. There is a degree of involvement of the thalamus which plays a major role in channelling stimuli specific input.
11. There is a definite sex difference.
12. Structural or hormonal differences between male and female brains account for some of the difference in the LD ratio in both the sexes.
13. Females have a greater representation of language in the right hemisphere than do males. Boys are more vulnerable to language and reading disabilities because of deviation in left hemisphere.
14. Alternate hypothesis :- Difference between boys and girls in sensorimotor integration is noticed.

Boys are involved in more gross motor activities as young children. Gross motor control skills become integrated primarily with sensory input to visual stimuli and the position of limbs in space, leading to efficiency in visuomotor integration. Thus males are better than females in these skills.

Girls are geared more towards fine motor control, which includes speech structures which are primarily integrated with the auditory system. Thus girls are superior in language skills. The diagram below illustrates the various parts of the brain and some of the functions and dysfunctions that have been established or hypothesised for them.

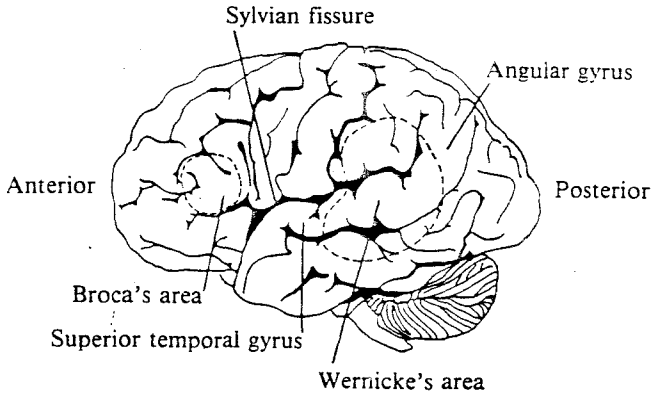
V. Cerebral cortex



Exterior, right lateral view of the human brain indicating some of the established and hypothetical functions and dysfunctions of the various areas of the cerebral cortex. Key: 1—Thought association, reasoning, and idea generation; 2—written expression; 3—Broca's speech-expression area; 4—voice and articulation control; 5—voluntary-movement expression; 6—body-surface sensations; 7—arithmetic understanding; 8—Wernicke's speech-understanding area; 9—reading recognition and comprehension; 10—visual sensations; 11—auditory sensations; 12—information organization, interpretation, and storage.

(Source: Dunn (1973). *Exceptional Children in the School*, Holt, Rinehart and Winston, Inc)

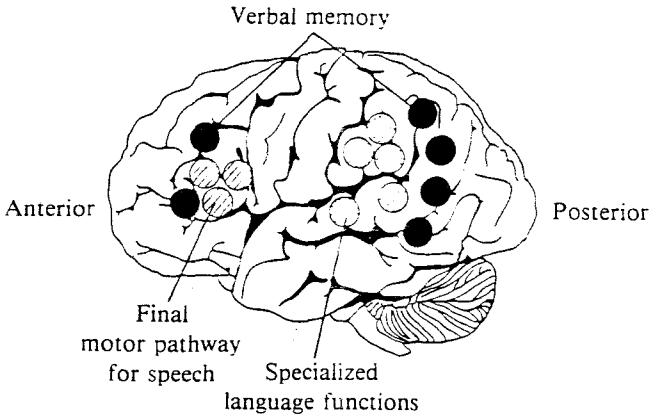
Areas of the Brain in which Differences in Electrical Activity Between Dyslexics and Nondyslexics Have Been Observed



Source: Reprinted by permission from Donna B. Bergerud, "The Neurological Basis of Learning Disabilities," unpublished manuscript, University of Washington, College of Education, Seattle, 1986.

(Source: Thomas C. Lovitt (1989). Introduction to Learning Disabilities, Allyn and Bacon)

Neurological Sites of Language and Learning Disorders



Source: Reprinted by permission from Donna B. Bergerud, "The Neurological Basis of Learning Disabilities," unpublished manuscript, University of Washington, College of Education, Seattle, 1986.

(Source: Thomas C. Lovitt (1989). Introduction to Learning Disabilities, Allyn and Bacon)

II. Embryological Theory

Before the 21st gestational week, neurons develop in a central area of the brain, then migrate to their final positions in the cortex. Right hemisphere develops 1 to 2 weeks earlier than the left in the normal brain. This developmental asymmetry causes the right temporal region to develop earlier and the left to become larger. This theory suggests that before 31st gestation week the foetus excess testosterone may be produced, particularly more frequently in boys. As a result growth of the left hemisphere could be delayed whereas right hemisphere remain unaffected.

Implications of Embryological Theory

- More male than female having LD
- High proportion of left-handers among children with LD
- Suppressing the development of a normal immune system. This is because of lack of proper development of the thymus, which is a structure of early life and necessary for normal immunological function. This results in high proportion of immune disorders among LD children and adults. Production of more testosterone is controlled by gene complexes. This explains the coexistence of familial clustering of handedness, immune disorders, and learning disabilities.

III. Hereditary and Genetic Influences

Identified a specific gene through study of certain Swedish family.

Specific mechanism

Pennington (1995) --> Genetic alterations in dyslexia alter or constrict the range of neural development and leads to aberrations in the neural tissue substrate.

Recent research explains which specific learning problems are inherited and which may have psychological or other biological bases.

Ex: Simple word reading and spelling skills are genetically influenced. Reading comprehension seems not to be influenced much by genetic factors. Impaired reading comprehension may represent a different form of dyslexia or manifestations of the right hemisphere syndromes.

Eugenics - "Well born" --> Selective breeding was evolved on a science

This was the beginning of science of genetics > derives information from psychology, medicine > genetic factors of certain diseases and conditions, sociology, demography (statistical study of human populations).

Francis Galton - Merits/Demerits were discussed by him about eugenetic as a science

Eugenics currently deals with the study of nature and causes of genetic defects, the ways in which psychological traits are determined at the relationship between environmental factors and hereditary.

The alarming observation is the number of people who are carrying defective genes is increasing due to exposure to damaging radiation, chemicals and other environmental hazards. Generations of poor nutrition also aggravates the problem.

IV. Teratogenic influences: Teratogens are the agents that produce or raise the incidence of congenital malformations

Placenta is not a protective shield as thought of earlier.

Critical period, threshold --> Depends upon the health, nutrition and genetics of the mother and the uterine environment and genetics of the foetus.

(a) **Alcohol:** Major impact is growth deficiency resulting from a diminished number of cells. It is more evident in brain and eye, particularly in midfacial growth.

Concentrations of alcohol in the foetus are atleast equal to that of mother. This has a toxic effect upon fetal organ development.

Maternal use of alcohol during pregnancy leads to learning problems, delayed psychomotor alert, impulsiveness, behavioural problems and emotional disorders.

Infrequent social drinking also risky. Mild alcohol consumption may lower fetal serum glucose. Thus rapidly dividing cells lose valuable energy stores leading to foetal cellular damage and deficiencies. Disproportionate skeletal features, lowered metabolic and mental capacities are the common symptoms of Fetal Alcohol Syndrome (FAS).

Moderately drinking mothers may give birth to children with shorter attention spans, more periods of inattention, stubbornness.

(b) **Smoking:** Nicotine and carbonmonoxide are the agents which affect foetal growth. Nicotine decreases uterine blood flow and decreased foetal breathing. Carbonmonoxide reduces foetal oxygen when it crosses the placenta. Mother's smoking beyond 4th month of pregnancy decreases reading ability of children. In summary maternal smoking leads to learning disorders, hyperactivity - impulsivity and neurological soft signs.

(c) **Lead:** Another important teratogen. According to a research study by National Institute of Occupational Health, Ahmedabad, the chief source of lead is the emission from petrol driven vehicles. Lead is added to petrol in the form of tetra-ethylin which improves the performance of the engine. Combustion leads to lead oxides which will be released to atmosphere.

Lead when inhaled enters the blood stream and accumulates over a long period and interferes with the production of RBC resulting in brain damage.

Adult - tolerance is high

Children - 6 months to 6 years more vulnerable.

Low level - irritability, abdominal pain, constipation, loss of appetite, weakness, severe cases > may suffer from seizure and loss of consciousness.

Long term effect - learning disability, reduced attention span or normal mental and neurological development are hampered.

Lead free petrol is recommended to prevent the problems.

Pollution check at petrol pumps, unleaded petrol --> vehicles with catalytic converters. One defence against lead poisoning is good nourishment. Well nourished children can withstand toxic effects. Good breakfast - rich in iron, plenty of fruits and vegetables has to be taken by the children. Vitamin C helps iron absorption. Increased absorption of lead leads to low store of iron. Therefore food rich in calcium are essential.

Cleaning all fruits and vegetables thoroughly, avoiding eating food from roadside shops, routine monitoring of lead levels in the blood and urine are some of the preventive measures.

(d) N-nitroso compounds - Pervelant in environment.

Sources: Cosmetics, urban air, car exhaust, cigarette smoke, rubber and plastic industries. They cause learning disabilities in children.

(e) Radiation

Major cause for birth defects. During critical periods chemical properties of the atoms and molecules within living cells will be changed leading to birth defect. Some of these lead to learning disabilities.

(f) Nutritional Influences

Sugar, particular canesugar leads to hyperactivity.

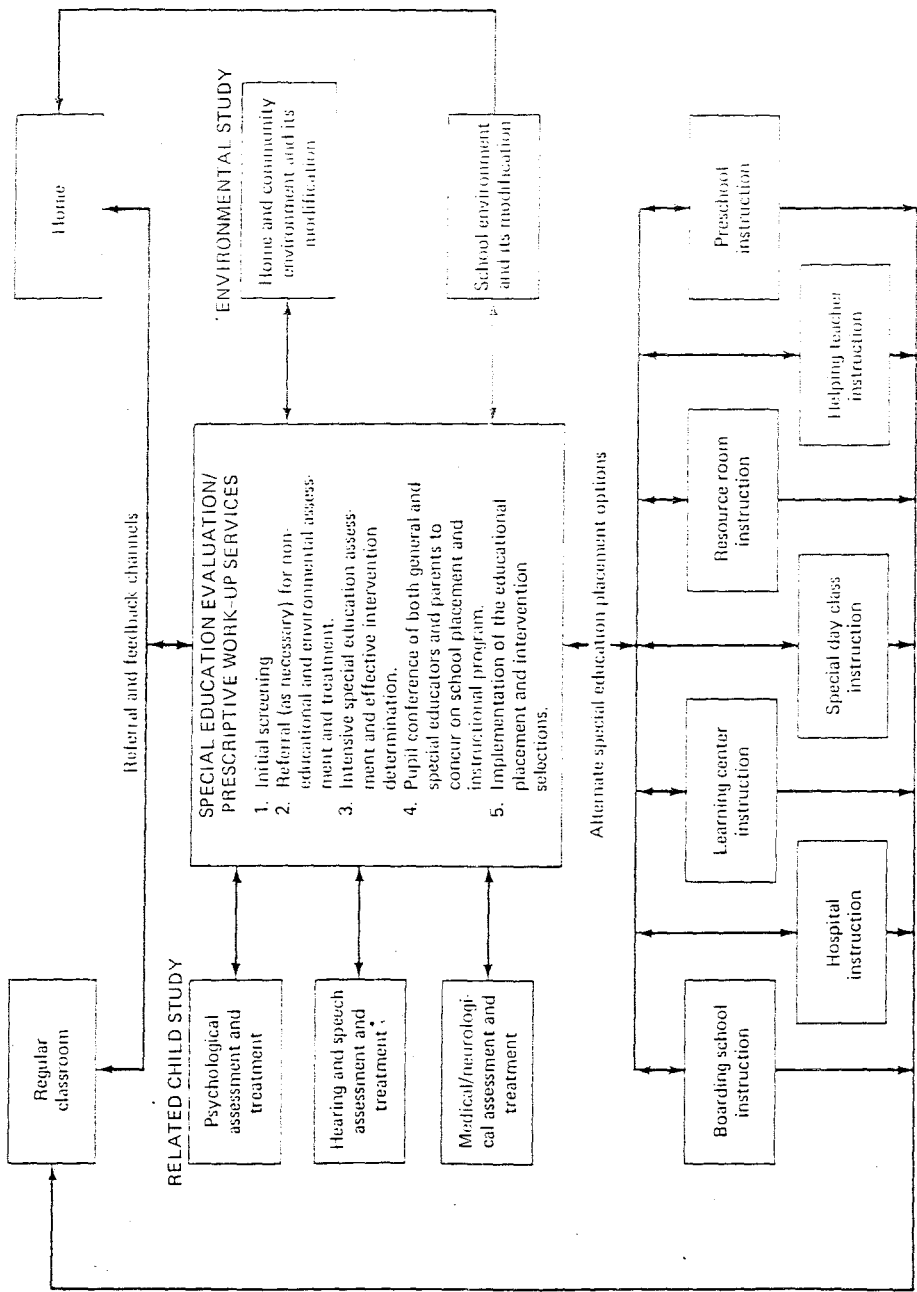
Crook (1974) suggests that milk, chocolate, cola, canesugar, beet sugar, cereal grain, eggs, citrus products, foods containing additives and colouring should be avoided. Important group of additives create neurological alterations. These alterations may not be detected at birth. Later behavioural disturbances and learning disabilities may be exhibited.

Deficiencies of fatty acids plus vitamins and minerals also lead to hyperactivity and disordered behaviour.

(g) Colonisation with candida albicans is another cause. Yeast free, sugar free diet is recommended.

Remedial Measures

1. Medical intervention/psychiatric treatment: Administration of psychotropic medications > continuous monitoring.
2. Psycho-educational intervention seems to be quite effective in reducing the academic difficulties. The following Flow Charts give a scheme for psycho-educational intervention. They highlight the importance of a multi-disciplinary team for diagnosis and intervention of children with LD.



Flow chart for special education and ancillary referral, assessment placement, and intervention services for children with specific learning disabilities (including restudy, recycling, and replacement when indicated).

(Source: Dunn (1973): Exceptional Children in the School, Holt, Rinehart and Winston, Inc.)

Some Areas Related to, and Specific Types of, Severe Learning Disorders Needing Consideration and Possibly Intensive Investigation and Attention

Areas for Investigation

Child-centered Variables

Hearing and Speech Factors

1. Differential diagnosis among brain injury, emotional disturbance, and mental retardation
2. Detection of neuro-psychological signs of brain damage
3. Motivational factors
4. Learning characteristics

Medical/Neurological Factors

1. Hearing acuity deficit
2. Visual acuity deficit
3. Eye-movement problem
4. Chronic illness
5. General health, nutrition, sleep, and rest problems
6. Metabolic or glandular problems
7. Endocrine dysfunction
8. Brain dysfunction
9. Drug addiction
10. Laterality problem
11. Incoordination
12. Activity level

Some Intervention

1. Mental health consultation
2. Learning and motivation consultation
3. Research consultation
4. Psychotherapy for emotional disturbances
1. Consultation on treatment of children with hearing problems
2. Consultation on treatment of children with speech disorders
3. Actual therapy for hearing and/or speech disorders
1. Corrective devices
2. Surgery
3. Medication

Environmentally Centered Variables

Home & Community Factors

1. Ineffective parents (child neglect or excessive pressure)
2. Family instability and deterioration
3. Parent uninterested in education
4. Inadequate home language models
5. Inadequately educated parents
6. Lack of cultural opportunities
7. Lack of educational materials in the home
8. Excessive migrant behavior
9. Poverty and slum conditions

Options

1. Parent counseling
2. Parent education
3. Financial support
4. Foster home placement
5. Community services
1. Teacher, pupil, or school transfers
2. Provision of ancillary services (including remedial instruction)
3. Provision of out-of-school supplementary tutoring, therapy, etc.

Specific Learning Disability Areas

Diagnosis and remediation in one or more of the following categories:

1. Motor
2. Visual perceptual
3. Auditory perceptual
4. Oral language
5. Reading
6. Spelling
7. Writing
8. Arithmetic

(Source: Dunn (1973). Exceptional Children in the School, Holt, Rinehart and Winston, Inc.)

Early identification of learning disorders is very essential. During pre-school age academic readiness skills have to be taught deliberately in a structured way. Medical and psychological therapies can be used wherever essential and possible. Remedial instruction is a must.

References

- Davision C. Gerald and Neale M. John (1994), *Abnormal Psychology*, Sixth Edition, John Wiley and Sons, Inc.
- Dunn M. Lloyd, Editor (1973). *Exceptional Children in the Schools*. Holt, Rinehart and Winston, Inc.
- Galburda, A.M. and Kemper, T.L. (1979). Cytoarchitectonic Abnormalities in Developmental Dyslexia: A Case Study, *Annals of Neurology*, 6, 94-100.
- Gowramma, I.P. (1998). Development of remedial Instruction Programme for Children with Dyscalculia in Primary School, Unpublished Doctoral Thesis, University of Mysore, Mysore.
- Ramaa, S. (1990). Study of Neuropsychological processes and logico-mathematical structure among dyscalculics, ERIC (NCERT), Project Report, Regional Institute of Education, Mysore.
- Ramaa, S. (1992). *Handbook on Learning Disabilities*. RIE, Mysore.
- Ramaa, S. (1993). *Diagnosis and Remediation of Dyslexia: An Empirical Study in Kannada - An Indian Language*. Vidyasagar Printing and Publishing House.
- Ramaa, S. (1996) (Editor) *Package on Learning Disabilities*, RIE, Mysore.
- Saundra F. Rief (1990). *How to reach and teach ADD/ADHD children; Practical techniques, strategies and interventions for helping children with attention problems and hyperactivity*, Prentice Hall.
- Smith E.C. Thom et al. (1998). *Teaching Students with Special Needs in Inclusive Setting* (2nd ed), Allyn and Bacon.
- Sol Adler (1992). Nutrition and Language-Learning Development in Preschool Programs for Children with Learning Disabilities, *Journal of Learning Disabilities*, Vol. 15, No. 6.
- Source Book on Learning Disabilities (2000), State Council of Educational Research and Training (SCERT), Thiruvananthapuram.
- Sparks, S. (1984). *Birth Defects and Speech-Language Disorders*, San Diego: College Hill Press.
- Srimani, C.R. (1998). *Diagnosis and Remediation of Language Disabilities in Primary Schools*, Unpublished Doctoral Thesis, University of Mysore, Mysore.
- Thomas C. Lovitt (1989). *Introduction to Learning Disabilities*, Allyn and Bacon.
- Thomson, J.S. and Thompson, M.W. (1980). *Genetics in Medicine*, 3rd Ed., Philadelphia: Saunders.