

**A STUDY ON THE PREVALENCE OF LEARNING DIFFICULTY
IN SCHOOL CHILDREN AND AWARENESS OF LEARNING
DIFFICULTY AMONG PARENTS AND TEACHERS**

THESIS

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DOCTOR OF PHILOSOPHY

By

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Supervisor / Guide

MARCH 2016

Certificate and declaration by the candidate

This is to certify that this thesis entitled '**A study on the prevalence of learning difficulty in school children and awareness of learning difficulty among parents and teachers**' is the bonafide record of research work done by me, under the supervision and guidance of the Dr. B. S. Virudhagirinathan. It has not previously formed the basis for the award of any Degree, Diploma, associateship, fellowship or other similar title. I further certify that the work in the thesis represents my independent work.

R. FAIZ JAHAN BEGUM

March 2016

Certificate and declaration by the guide

This is to certify that this thesis entitled '**A study on the prevalence of learning difficulty in school children and awareness of learning difficulty among parents and teachers**' is the bonafide record of research work done by **R. FAIZ JAHAN BEGUM**, during the period of study under my supervision and guidance. It has not previously formed the basis for the award of any Degree, Diploma, associateship, fellowship or other similar title. It is further certify that the work in the thesis represents independent work on the part of the candidate.

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INTRODUCTION

Education is considered as one of the basic needs of human development which is very vital for the holistic growth of any country. Improved education often leads to an improved standard of living. Therefore, it is not uncommon that the happiness associated with the birth of a new family member is soon superseded by the concern over the basic needs of the child, especially education. To educate, one needs to learn to acquire new skills and attitude. Learning begins when a child listens to the language spoken and this is followed by speech / speaking. Learning is referred as the highest and most complex cognitive functions in the brain and any dysfunction to the brain can affect children in learning the basics of reading, writing and mathematical concepts¹.

Children who have difficulties in acquiring academic skills are generally perceived to have Specific Learning Disorder (SLD)². Specific Learning Disorder is a generic term that describes specific kind of learning problems. It is a neurological disorder that affects a child's brain and impairs its ability to carry out one or more specific tasks. It is otherwise commonly known as Dyslexia, Learning Difficulty, Learning Disability or Specific Learning Disorder. Specific Learning Disorder is related to academics as it is frequently diagnosed in school children. Children with Specific Learning Disorder exhibit difficulty in reading (dyslexia), writing (dysgraphia) and in mathematics (dyscalculia) in spite of intellectual ability ranging from average to above average^{3,4,5,6,7}. They are also good at other activities such as sports, dance, arts and craft, but find difficulty in academics^{7,8}. The problem is not restricted to any particular country, region or nation, but can affect any individual irrespective of

his/her language. There is no general agreed definition for the term Specific Learning Disorder and the term varies from one country to another.

The terms that are used internationally and in India are explained below.

United Kingdom

In the UK, the term ‘learning disability’ refers to a range of developmental disabilities or conditions that are almost invariably associated with more severe generalized cognitive impairment.

United States and Canada

In the United States and Canada, the terms ‘learning disability’ and ‘learning disorder’ (LD) refer to a group of disorders that affect a broad range of academic and functional skills including the ability to speak, listen, read, write, spell, reason, organize information, and do math. A person’s Intelligence Quotient (IQ) must be average or above to diagnosis a learning disability or learning disorder⁹.

India

In the Indian context the term Specific Learning Disorder, illustrated among parents, teachers and health professionals as Learning Disability, Learning Difficulty, Specific learning disability or dyslexia. Teachers or parents identify children with SLD only when the child enters into formal school education and when learning of certain skills takes place. Specific Learning Disorder is considered to be as a hidden handicap as these children perform better in other activities when compared to academics (involve reading, writing, spelling, listening and mathematical skills). Children with learning disability are found across all ages, socio-economic level and races^{10,11}. The learning

problem among children varies from mild to severe pertaining in one or two areas or in combination. Children with a Specific Learning Disorder can be found in any class level for instance a recent survey conducted in the National capital Delhi reported that more than 183,000 children in the age group below 14 years were unable to read and write and 37 percent of the children from government primary schools (ages 7 to 10 years) cannot read simple words and 52 percent could not recognize numbers¹².

Specific learning disorder is one of the major problems for parents and teachers, these normal appearing children make errors in reading simple words and sentences, unable to copy from the blackboard, have incomplete class notes and test paper, difficulty in applying basic operational skills like addition, subtraction, difficulty in time concept, difficulty in recollecting what happened in the class, home assignment and so on. This generally pushes the parents to a state of embracement and teachers find it difficult to handle children with Specific Learning Disorder as they are not trained.

1.1.GOVERNMENT ACTS / LAWS FOR SPECIFIC LEARNING DISORDER

- a. International Law
- b. National Law

1.1a. INTERNATIONAL LAW

The United States was the first nation to pass a law on education, especially for children. The first federal law was passed on ‘The Education for All Handicapped Children Act’ (1975), ‘Individuals with Disabilities Act’ (1990 & 1997) and the last was ‘Individuals with Disabilities Education Improvement Act’ (IDEA, 2004). All

these acts were passed to improve the education of children with disabilities and strengthen the role of parents and teachers to manage children with disabilities^{13,14}.

1.1b. NATIONAL LAW

One can come to an understanding that the United States of America passed this act nearly two decades before the Indian Government. There are four important acts that were passed by the Indian legislation which includes,

- 1) The Rehabilitation Council of India Act, 1992, which was amended by Parliament in 2000. The responsibility of the council is to regulate and monitor the training of rehabilitation professionals and personnel, promoting research in rehabilitation and special education and maintaining of the Central Rehabilitation Register¹⁵.
- 2) The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 provides education, rehabilitation, employment, non-discrimination and social security to persons with disabilities. It defines '*disability*' as blindness, low vision, hearing impairment, loco-motor disability, mental retardation, mental illness and disabilities arising among those cured of leprosy. It also defines '*person with disability*' as a person suffering from not less than forty percent of any disability as certified by a medical authority¹⁶.
- 3) The Mental Health Act, (1987) recognize mental health as one of the disabilities under The Persons with Disabilities (Equal Opportunities,

Protection of Rights and Full Participation) Act, 1995. The Act, focus is towards treatment and care of the mentally ill persons to make better provision with respect to their property and affairs and for matters connected therewith or incidental thereto¹⁷.

- 4) The National Trust for the Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act, 1999, deals with care and protection of four specific categories of Persons with Disabilities¹⁸.

The Indian Constitution Article 14 enables children to enjoy equal rights as adults, while Article 15(3) empowers special provisions for children. The Right to Children to Free and Compulsory Education Act, 2009 (No. 35 of 2009), a new Article 21 A inserted that states to provide free and compulsory education to all children of the ages of six to fourteen years was enacted by the parliament on 26th August, 2009. The Act was implemented from 1st April, 2010. The Act was formulated following the 86th Amendment of the Constitution of India enacted on 12th December, 2002. The Indian educational system is providing formal education (exclusive settings) to individuals with disabilities under this Act. It does not pay attention to children with SLD as it is done in the international level because the specialist, educators and parents consider these children to be normal but lazy^{18a}.

3The main purpose of the Indian Government to introduce Persons with Disabilities Act, 1995, and the 2012 Draft Bill is to provide appropriate intervention / rehabilitation to people with various disabilities, create awareness and also enjoy facilities provided by Government of India, Ministry of Social Justice and

Empowerment, Department of Disability Affairs (financial support, study material, job placement and education facilities). The department also offers education facilities to people with various disabilities such as exemption from the second language, one-hour extra time, allowance for spelling, Scribe, using calculator or Clark's book in the tenth and twelfth board examinations. Children with Specific learning disability / Disorder are included in Other Type of disability category in the Persons with Disabilities Act (1995)^{18a}.

There is no census related to the percentage of children affected with specific learning disability / disorder and often do not provide with appropriate help and support by parents and teachers due to lack of knowledge and understanding of the problem. Research has been conducted in the field of Specific Learning Disorder (SLD) basically related to conditions and causes. Many other researchers worked on intervention which is in the initial stage. It is important to know the awareness level of the teacher and parents with regards to SLD. It is also necessary to understand the intensity of the problem and know the percentage of school children affected with Specific Learning Disorder. In-depth research should be conducted in various domains such as reading, written expression and Mathematics. This will in turn throw light on the interventional aspect of SLD among parents and teachers.

1.2. HISTORY OF SPECIFIC LEARNING DISORDER

The concept of learning disabilities evolved over the last 200 years. It is framed into different phases based on individuals who have made a significant contribution to the field of learning disabilities. These phases include,¹⁹

- a. Foundation Phase
- b. Transition Phase
- c. Integration Phase

1.2a. Foundation Phase (1800–1930): During this phase many research studies were carried on brain-damaged adult patients who had suffered a stroke, accident or disease and this, in turn, have affected their ability to speak or read. Theories were built by physician merely based on their clinical observation as there was no empirical hypothesis testing procedure using controlled group. It was Gall in 1802, who examined the adults who have sustained head injuries and lost their ability to express their thoughts, feeling and ideas through speech, without any change in their intellectual functioning. The first case of ‘acquired reading disability’ was reported by Dejerine (1887) in the adult patient (brain-damage) who lost their ability to read with no effects in understanding and spoken language. By 1900, efforts were taken to understand the facts that these children with learning difficulty were not mentally retarded. Head (1926) concluded that language disorder in an individual does not denote loss of other functions²⁰. There were two groups working in the field of mental health, one investigated the research work related to mental retardation and other group focused on patients with brain injuries. The latter group led to the path of learning disabilities. Hinshelwood (1917) claimed that developmental reading problem among children are caused due to some congenital brain deficit and termed it as ‘*congenital word blindness*’^{21,22}. James Keer and Morgan (1896) reported cases with severe reading problems (known as dyslexia) in spite of normal intelligence. Orton (1925) formulated his own theories on causes and remediation of reading

problem and termed it as '*Strephosymbolia*' (twisted symbols) to describe memory and orientation problems of the individuals whom he had worked on²³.

1.2b. Transition Phase (1930-1960): In this phase efforts were made to transfer the theoretical hypothesis derived from previous stage (foundation phase) into remedial implementation. Heinz Werner and Alfred Strauss (1937) developed concepts and investigated that the characteristics of the brain injured and mentally retarded were quite similar²⁴. While Kurt Goldstein (1939) hypothesized that brain damage affects the behaviour (hyperactivity) and impairs the perceptual ability of an individual²⁵. Many studies focused on developmental disorders in children. Psychologist and educators played an important role as they became more aware of the field of "Learning Disabilities". Many assessment tools and training programs were developed which were mostly used by private clinics, schools and institution. Programs were also introduced to Public school during the end of this phase and assessment tools were developed (the Auditory Discrimination test by Wepman; Illinois Test of Psycholinguistic Abilities by Kirk and McCarty; Examining for Aphasia by Eisenson, phonics training by S. Kirk & W. Kirk). Professionals restricted themselves to the scope of conditions and specialized themselves to reading therapist, language therapist, etc. No professional considered themselves to be a specialist in learning disabilities in spite of the existing field, which in turn lead to the development of the third phase.

1.2c. Integration Phase (1960 – 1980): In the initial years Cruickshank (1961) did a lot of research among children with hyperactivity. He noted that reduction in environmental stimuli, space, structured programme and enhancing teaching material helps in reducing hyperactivity and improves learning²⁶. The term ‘learning disabilities’ describes a group of children who have disorders in developmental skills needed for social interaction, which does not include children with sensory handicaps such as blindness or deafness. The methods for managing and training the deaf and blind are available which also exclude children who have generalized mental retardation²⁷. These were the criteria that were addressed to a group of concerned parents of children who had difficulty in reading and whom the doctors and physicians labelled them as ‘*Minimal Brain Dysfunction*’ (MBD) which was not accepted among parents^{28, 29}. Council for Learning Disabilities was formed in the year 1968 with professionals working in schools and colleges in the areas of special education in order to promote education towards the welfare of persons with specific learning disabilities. The Learning Disability Quarterly journal was first introduced in the year 1982 with over 10000 members. Training was conducted among 87 teacher-trainers from different universities who had a chance to interact and discuss the problems related to children with learning disabilities. It was organized by ‘The Advance Institute of Leadership Personal in Learning Disabilities’. The outcome of the meeting gave valuable information about the “elder statesmen” - Cruickshank, Frostig, Kephart, Kirk and Myklebust and their contribution to the field of learning disability. During the years 1971 to 1977, a lot of focus was on instructional services, technical assistant, data collection and research project. Universities started investigating in different areas such as ‘information processing’ among elementary aged children with learning disability (Frances P. Connor, Columbia University

Institute, 1971), while Meyen & Donald Deshler, 1978 studied the issues related to identification and treatment of Learning Disability among adolescents³⁰. James Yesseldyke (1978) team at University of Minnesota, researched on identification, assessment and placement issues of persons with learning disability³¹ and Daniel P. Hallahan (1973) of University of Virginia, in his study focused on attention deficit and self-activated learning strategies³². At the University of Illinois, Bryan (1978) and her team investigated language and social skills, reading and learning / recall problems³³. During 1980, Society for Learning Disabilities and Remedial Education was formed which consisted of only professionals working with individuals having difficulty with reading, writing, speaking, listening, thinking and doing mathematics.

During this phase acceptance was received among parents and teachers and the field of learning disability grew rapidly as programmes and assessment tools were developed. Teachers were trained and children received remedial services. The first public school programme for learning disability was established in Syracuse, New York, with curriculum involved reducing unessential visual and auditory environmental stimuli, structured schedule and increasing stimulus value of the teaching materials.

1.3. DEFINITIONS OF SPECIFIC LEARNING DISORDER

The term Learning Disability was first used by Dr. Samuel Kirk of Chicago, USA in 1963 and later an Act was passed in 1969 by USA for children with learning disabilities commonly known as the Federal Definition or IDEA^{13,14,34}. There are various definitions used to identify children with SLD internationally and in India and are arranged following.

1.3.1. International Definitions

1.3.1a. Federal Definition or IDEA, 2004^{34,35}

1.3.1b. International Classification of Disease: Mental and Behavioural Disorders (ICD-10, WHO, 1993)³⁶

1.3.1c. World Health Organization (WHO, 1998)³⁷

1.3.1d. Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition (DSM-V, 2013)²

1.3.2. Definition used in India

1.3.2a. Right of Persons with Disability (Draft Bill, 2012)¹⁶

1.3.1. INTERNATIONAL DEFINITIONS

The following are definitions that are use internationally to identify children with Specific Learning Disorder (SLD).

1.3.1a. Federal Definition: The most commonly used definition was brought by the U.S. Office of Education (1977) USA, under the ‘Individuals with Disabilities Education Improvement Act’ (IDEA- 2004) that defines ‘Specific Learning Disability’ as a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations. This term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual,

hearing or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural or economic disadvantages^{34,35}.

1.3.1b. International Classification of Disease and Related Health Problems (ICD-10, WHO, 1993) defines learning disabilities as ‘Specific developmental disorders of scholastic skills’ (SDDSS), in which the normal patterns of skills acquisition are disturbed from the early stages of development, not as a consequence of lack of opportunity to learn or due to any form of acquired brain trauma or diseases³⁶.

1.3.1c. World Health Organization (WHO) defines learning disabilities as ‘a state of arrest or incomplete development of mind’ and somebody with learning disability is said also to have significant impairment of intellectual functioning and significant impairment of adaptive / social functioning³⁷.

1.3.1d. Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition (DSM-V, 2013)²

Specific Learning Disorder, as the name implies, is diagnosed when there are specific deficits in an individual's ability to perceive or process information efficiently and accurately. This neurodevelopmental disorder first manifests during the years of formal schooling and are characterized by persistent and impairing difficulties with learning foundational academic skills in reading, writing, and/or math. The individual's performance of the affected academic skills is well below average for age, or acceptable performance levels are achieved only with extraordinary effort. Specific learning disorder may occur in individuals identified as intellectually gifted and

manifest only when the learning demands or assessment procedures (e.g., timed tests) pose barriers that cannot be overcome by their innate intelligence and compensatory strategies. For all individuals, specific learning disorder can produce lifelong impairments in activities dependent on the skills, including occupational performance².

Table 1 - Diagnosis criteria of SLD (Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition, DSM-V, 2013)²

A.	<p>Difficulties learning and using academic skills, as indicated by the presence of the least one of the following symptoms those have persisted for at least 6 months, despite the provision of interventions that target those difficulties.</p> <ol style="list-style-type: none"> 1. Inaccurate or slow and effortful word reading (e.g., read single words aloud incorrectly or slowly and hesitantly, frequently guesses words, had difficulty sounding). 2. Difficulties understanding the meaning of what is read (e.g., may read text accurately but not understand the sequence, relationship, inferences, or deeper meanings of what is read). 3. Difficulties with spelling (e.g., may add, omit, or substitute vowels or consonants). 4. Difficulties with written expression (e.g., make multiple grammatical or punctuation errors within sentences; employs poor paragraph organization; written expression of ideas lacks clarity). 5. Difficulties mastering number sense, number facts, or calculation (e.g., has poor understanding of numbers, their magnitude, and relationship; counts on fingers to add single-digit numbers instead of recalling the math fact as peers
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	do; gets lost in the midst of arithmetic computation and may switch procedures). 6. Difficulties with mathematical reasoning (e.g., has severe difficulty applying mathematical concepts, facts, or procedures to solve quantitative problems).
B	The affected academic skills are substantially and quantifiably below those expected for the individual's chronological age, and cause significant interference with academic or occupational performance, or with activities of daily living, as confirmed by individually administer standardized achievement measures and comprehensive clinical assessment. For individuals ages 17 and older, a documented history of impairing learning difficulties may be substituted for the standardized assessment.
C	The learning difficulties begin during school-age years but may not fully manifest until the demands for those affected academic skills exceed the individual's limited capacities (e.g., as in timed tests, reading or writing lengthy complex reports for a tight deadline, excessively heavy academic loads).
D	The learning difficulties are not better accounted for by intellectual disabilities, uncorrected visual or auditory acuity, other mental or neurological disorders, psychosocial adversity, lack of proficiency in the language of academic instruction, or inadequate educational instruction ² .

Specific Learning Disorder (SLD) ² is the current terminology used to identify children with learning disorders / disabilities / difficulties / dyslexia which are interchangeably used. The highlight of the DSM-V, 2013 signifies that discrepancy between IQ and the affected learning domain is no longer required for diagnosing learning disorder² which had been adapted for the present study. While the academic

skills should be affected below average for the age and not performance of the affected skills and should not be attributed to intellectual disability. There have been controversies among researchers related to the definition, but all accepted that children with SLD need to be identified and given appropriate help.

1.3.2. DEFINITION USED IN INDIA

In India the definition of Specific Learning Disorder (SLD) is adapted from the west and children with learning problem includes dyslexia, dysgraphia, dyscalculia which are commonly referred to as ‘Learning Disability’ or ‘dyslexia’ among parents, teachers and health professionals.

1.3.2a. Right of Persons with Disability (Draft Bill, 2012) defines ‘Specific Learning Disabilities’ refers to a heterogeneous group of conditions wherein there is a deficit in processing language, spoken or written, that may manifest itself as a difficulty to comprehend, speak, read, write, spell, or to do mathematical calculations. The term includes such conditions as perceptual disabilities, dyslexia, dysgraphia, dyscalculia, dyspraxia and developmental aphasia¹⁸.

1.4. SPECIFIC CATEGORIES OF SPECIFIC LEARNING DISORDER

The American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM-V, 2013) had broadened the diagnostic category by using the generic term ‘*Specific Learning Disorder*’ as overall diagnosis, integrating difficulties in learning academic skills, such as reading, writing, and mathematics, which had been classified as separate disorders in previous DSM-IV-TR, 2005³⁸.

The current terminology used as per DSM-V, 2013 under category of Specific Learning Disorder is listed below²

- a. Specific Learning Disorder with impairment in reading – Dyslexia.
- b. Specific Learning Disorder with impairment in written expression – Dysgraphia.
- c. Specific Learning Disorder with impairment in mathematics - Dyscalculia

The above-mentioned disorder mostly affects the academic performance of children with regard to reading, writing and mathematical skills. The problem is specific to the domains of reading or writing or mathematics or in combination, but not necessary that a child with writing difficulty need to have difficulty in mathematics or reading.

1. 4a. Specific Learning Disorder with impairment in reading - Dyslexia

Dyslexia is a Greek word which means ‘difficulty with words’. It is a brain-based type of learning disability that impairs a person's fluency or accuracy in being able to read, speak, and spell, and which can manifest itself as a difficulty with phonological awareness, phonological decoding, auditory short-term memory, and rapid naming. It is Rudolf Berlin (1887) of Stuttgart, Germany was the first coin the term dyslexia³⁹. Individuals with this disorder typically read at levels significantly lower than expected despite having normal intelligence which varies from person to person and usually occurs in an adult after a brain injury or with dementia. Dyslexia can also be inherited in some families, and recent studies have identified a number of genes that may predispose an individual to develop dyslexia. Although dyslexia is not an intellectual disability, it is considered both a learning disability and a reading disability. Dyslexia and IQ are not interrelated as reading and cognition develop independently among

individuals with dyslexia⁴⁰. Children and adults with reading disabilities were traditionally named as ‘developmental dyslexia’, ‘Strophosymbolia’, or ‘Congenital word blindness’ which expresses the same disorder⁴¹. Hinshelwood (1917) was the pioneer in research on reading disabilities describes ‘a boy (14 years) bright, intelligent and good at other activities was in no way inferior to others compared to his age, except in his ability to learn to read. The boy was fond of Mathematics and had no difficulty with it, his school master reported that he would be the smartest if the instructions were addressed to him orally’²¹.

Reading is an integral part of the language system and is the primary skill that established after listening and speaking at a particular age. Children with learning disorder have normal speech, hearing and sight and do not exhibit difficulty in listening and speaking skills. In today’s world a lot of focus is made on the one’s reading ability of the child irrespective of class or age if one is unable to meet the required criteria, then one need to readily accept the criticism. Reading disorder can hinder the academic performance of the child and can also be related to other disorders such as writing and mathematics⁴². Previous research indicated that children with dyslexia lacked phonemic awareness⁴³. Dyslexia is of two types one is the acquired dyslexia which is a result of accident or stroke in an individual at any age (damage to the brain) and second is developmental dyslexia that occurs during the developmental age (0-18 years). Reading disorder is also considered as visual disorder⁴⁴, but with specific and serious difficulty with nervous system which represents sounds that make words⁴⁵. Four percent of the school-age children in the USA have Reading Disorder (dyslexia)³⁸ and the most common disorder among all students with Specific Learning Disorder (SLD) affecting 70 to 80 percent of children

with reading deficit⁴⁶. It is necessary to keep in mind that one or two characteristic / symptoms of reading disorder do not make a child dyslexic, but one should look out and note the frequent occurrence of the symptoms which should last for six months despite intervention². Specific Learning Disorder with impairment in reading (Dyslexia) includes difficulty in word reading accuracy, reading rate or fluency and reading comprehension.

Characteristics of dyslexia vary from person to person which includes variety of reading problem such as,

- i. Lack of understanding to read,
- ii. Lack of awareness of sounds that make up words including blending sounds,
- iii. Delay in speaking,
- iv. Delay in learning the alphabet, numbers, days of the week, months, colours, shapes other basic information,
- v. Proper ordering of letters in a word,
- vi. Trouble with rhyming words,
- vii. Problem with spelling,
- viii. Difficulty with pronouncing words,
- ix. Listening comprehension better than reading comprehension,
- x. Spatial directional confusion (left-right disorientation),
- xi. Lack of vocabulary

1.4b. Specific Learning Disorder with impairment in written expression - Dysgraphia

Writing Disorder (dysgraphia) is defined in two ways Agraphia and Dysgraphia. Agraphia is associated with loss ability to write due to brain injury (acquired) and unusual difficulty in learning to write (developmental)⁴⁷. Dysgraphia is an inability to perform the motor movements required for handwriting and the condition is generally associated with neurological dysfunction⁴⁸. The term dysgraphia is at times interchangeably used for writing disorder.

Writing is the most common form of communication and is integrated part of the language system as it is linked with oral language and reading³⁸. One should write neatly and legibly to communicate their ideas, feelings and share knowledge. Writing is a process of writing a message from the original ideas of the author⁴⁹. Writing begins at primary class level (strokes, direction, letters and words) and it is developed earlier than reading⁵⁰. The pattern of teaching handwriting is a common fashion and the teachers' does not insist on proper alignment or quality of writing. If the teachers' pay more attention towards legibility and letter casing at an initial stage, then the child may have less difficulty in future. The handwriting styles are unique to individuals considered as he / she adapted to it⁵¹. Dysgraphia can also occur in mathematics as the student confuses and illegibly or incorrectly enters a wrong number or symbols.

Writing disorder includes difficulty in,

- i. handwriting,
- ii. spelling and
- iii. grammar, punctuation and clarity in written expression

1.4b.i. Writing is thought to be challenging, as complex skills are required for coordination of several abilities such as thoughts, ideas, hand and fingers positioning to complete the written task. Writing is one of the most multi-part human functions which are critical skill for academic, social and behavioural well-being. Hooper (1994) stated that writing difficulties among middle school students ‘should be of major national concern’⁵². The developmental path of written language has been demonstrated to be an important predictor of a child's overall development⁵³. Children having a problem in acquisition and use of written language can last even as they grow into adults⁵⁴. There is a strong relationship between reading and writing languages, as reading is a receptive form and the latter is an expressive form of language⁵⁵. Writing disorder is not related to intelligence, but there is a relationship between poor handwriting and poor spelling⁵⁶. Hallahan, Kauffman and Lloyd (1985) reasoned it out to be due to handwriting (poor letter formation) and slow in writing (unable to recollect what has been spelled)⁵⁷. A severe problem in writing in childhood can persist into adult age^{49,58}.

1.4b.ii. Spelling disorder is far more complex than reading as it requires recalling from memory, using vocal and motor skills³⁴. To spell words one should learn the phonetic of the letters within the words and spelling disorder is often found among children with SLD. It is believed that spelling errors are due to an omission of a letter within a word⁵⁹.

1.4b.iii. Written Expression is the area in which children have a problem expressing their thoughts ideas and feelings in written form. Research in the area of writing difficulty is relatively new and investigations are related to the type of errors,

organization of thoughts, number of words used, etc. Poteet (1978) found that children with a learning disability had difficulty in recollecting words, sentences and tend to make punctuation errors than non-learning disabled children on a 'Picture Story Language Test'⁶⁰. In another study it was found that mechanical errors related to tense, plural, spelling were difficult to children with learning disability⁶¹.

The common symptoms in individual with impairment in written expression (dysgraphia / writing disorder) are observed when writing is inappropriate in size, too much space between letters or words, illegible handwriting, omissions of letters or words, spelling errors, lack of organization, clarity, unity, fragmentation of written concepts, mechanical errors, reversals, transpositions, grammatical error, incomplete class note or assignments, written ideas disorganized, incomprehensible and does not enjoy writing task.

Over the years, many different terms like Dysgraphia⁶²; Developmental output failure⁶³; Writing Disorder⁶⁴; Writing Problems; Disorder of Written Expression; Problems in Written Expression⁶⁵; Writing Difficulties and Writing Disabilities⁴³ are used to describe problems of Specific Learning Disorder with impairment in written expression². Research in writing disorder has increased only in the past two decades in sharp contrast to research conducted in reading disability (RD)^{66,67}. Hence early identification and timely intervention can improve the writing skills.

1.4c. Specific Learning Disorder with impairment in Mathematics - Dyscalculia

Mathematics is the most important element, as it plays a major role in an individual's life and is applied in everyday activities where numbers are involved. It is a symbolic and universal language as it enables human beings to think, record ideas concerning quantity³⁴. Dyscalculia is a medical term that indicates lack of ability to perform mathematical functions and it is associated with neurological dysfunction. Dyscalculia is also referred to having poor 'number sense'⁶⁸. Cohn (1961) found that dyscalculia occurs due to a lesion in the brain where language and arithmetic originates⁶⁹. Later Hacaen (1967) and Kose (1974) introduced the term 'Developmental Dyscalculia' as it is a structural disorder^{70,71}. Dyscalculia may result from lesions in widely different regions of the brain. Dysfunctions associated with left hemisphere lesion may cause difficulty in counting, sequence or read numbers^{71,72} but, according to Piaget (1969), dyscalculia is directly associated with stage-specific development⁷³. Grewal (1952) reported that children with difficulty with carrying decimal need not have difficulty in the mental mathematics or retaining the concepts⁷⁴. Approximately 6 percent of the school population had been reported to have difficulties in mathematics which cannot be attributed to low intelligence, sensory deficits or economic deprivation⁷⁵. Dyscalculia symptoms are noticed as early as the child is in the primary school and which may continue to affect even in adulthood^{34,76,77,78,79}. Studies also reported that one-fourth of the children who have been identified with dyscalculia at fourth grade still continue to have difficulty in their seventh grade^{78,79}. At times, children with the mathematical disorder have difficulty in mastering reading and writing⁸⁰.

Kosc classified true dyscalculia with the presence of following six categories⁷¹.

- i. Verbal Dyscalculia – difficulty with the verbal use of mathematical terms and symbols.
- ii. Practognostic Dyscalculia – inability to recognize distinguishing features or to make comparisons of objects that vary on some dimension, for example, size.
- iii. Lexical Dyscalculia – difficulty in reading digits, symbols & multi-digit numbers.
- iv. Figureical Dyscalculia – difficulty in writing dictated numbers, copying symbols & geometrical figures.
- v. Ideognostical Dyscalculia – Difficulty in comprehending mathematical ideas and making mental calculations.
- vi. Operational Dyscalculia – Difficulty in completing basic operations of addition, subtraction, etc confusion among the operations and the appropriate algorithm for each.

Children with SLD often have a mathematic disability (dyscalculia) that affects their day to day activities and are common among all age group. Dyscalculia need not be necessarily associated to a lesion in the brain, but it can be due to anxiety towards the subject or fear towards the teacher. Looking for early symptoms is important. It is presumed that 15 to 20 percent of children with SLD have co-morbid Attention Deficit Hyperactivity Disorder (ADHD), with characteristics of hyperactivity, impulsivity and inattention and this co-morbidity further impairs their learning skills^{81, 82, 83, 84}.

However, problem-related to SLD in reading, writing and mathematics is on the increase among school children in India. It is time for parents and teachers to accept the presence of a problem in children and look out for symptoms by offering appropriate remediation. There are many great personalities who had a learning disability in some form or the other, but never stopped themselves from being successful in life and career. Many people in the history have struggled and found it difficult to manage their learning disability. The famous personalities listed below will definitely be a motivational factor for children suffering from SLD and their parents and teachers.

Table 2 - Famous personality with learning problem

Sl.No	Personality	Disorder	Career
1	Nelson Rockefeller	Dyslexia-Reading Disorder	Former vice-president of USA
2	Thomas Edison	Dyscalculia-Mathematic Disorder	Scientist / Inventor
3	Woodrow Wilson	Dyslexia-Reading Disorder	Former 28 th President of USA
4	Albert Einstein	Dyslexia-Reading Disorder	Genius Mathematician
5	George Washington	Learning Disability	Former President of USA
6	Tom Cruise	Learning Disability	Hollywood Actor
7	Sachin Tendulkar	Learning Disability	Cricketer
8	Abishek Bachan	Learning Problem	Bollywood Actor
9	Alexander Graham Bell	Learning Disability	Inventor / Scientist
10	Walt Disney	Dyslexia-Reading Disorder	Film Producer, director & philanthropist
11	Bill Gates	Suggested Autism	CEO, Microsoft

1.5. CAUSES OF SPECIFIC LEARNING DISORDER

Researchers and scientists have been trying to understand various factors that can cause SLD. Though there is no single or primary cause for SLD, as people view it related to the child's environment and some view the problem lies within the child. The definition of SLD relates it to neurological deficit which could result in genetic, brain damage, biochemical imbalance and environment.

- i. Genetic
- ii. Brain Damage or Dysfunction
- iii. Biochemical Imbalance
- iv. Environmental Factors

1.5i. Genetic: The relationship between genetic and learning disabilities remains obscure, but evidence suggest that members of a family to have learning disabilities. It was found that 88 percent of the families with dyslexia show a similar problem in learning^{85,86}. Rossi (1972) discussed the possibility, that some forms of learning disabilities appear to be based on genetic neuro-chemical dysfunction⁸⁷. In another study dyslexia in twins, reported that 12 sets of the identical twins were dyslexic⁸⁸. This was proved by Sliver (1971) who studied 556 children and discovered familial patterns in children with neurologically based learning disabilities⁸⁹. Genetic studies related to reading disability show only about 50 percent of the unevenness in reading skills that were explained by genetic factors². Siblings and children of persons with reading disabilities have a slightly greater than normal likelihood of having reading problems. There is growing evidence that genetics may account for at least some family links with dyslexia^{90,91}. Few researches had located possible chromosomal loci

for the genetic transmission of phonological deficits that may predispose a child for reading problems later^{92,93}.

1.5ii. Brain Damage or Dysfunction: It is believed by some professionals that children with Specific learning disorder suffer from some type of brain injury or dysfunction of the central nervous system. Advanced studies in magnetic resonance imaging (MRI) technology enabled researchers to discover a specific region of the brain of individuals with reading and language disabilities. The results showed activation patterns during phonological processing tasks that were different from the patterns found in the brain of non-disabled individuals^{94,95,96}. Leonard (2001) pointed out that the actual structure of the brain of some children with reading disabilities differ slightly from that of children without disabilities⁹⁷.

1.5iii. Biochemical Imbalance: There were theories that biochemical disturbances within a child's body cause learning disabilities. Feingold (1975, 1976) claimed that artificial colourings and flavourings in many of the food consumed by children can cause learning disabilities and hyperactivity. Hence, he recommended children with learning disabilities should have a diet that does not contain synthetic colours or flavours⁹⁸. Spring and Sandoval (1976) conducted studies on special diet, concluded very little scientific evidence to support the above study by Feingold's⁹⁹.

1.5iv. Environmental Factors: Although it is very difficult to document the primary causes of learning disabilities, environmental factors such as impoverished living conditions during early childhood and poor instruction can probably contribute to the achievement deficits that are experienced by children in special education category.

The tendency for learning disabilities to run in families suggests a correlation between environmental influences on children's early development and subsequent achievement in school. A longitudinal research work conducted by Hart and Risley (1995), who found the relationship that infants and toddlers who received infrequent communication exchanges with their parents were likely to show deficits in vocabulary, language use, and intellectual development before entering school¹⁰⁰.

The quality instruction received by children with learning disabilities plays a major role. Special Educators believed that Engelmann (1977) concepts was correct, children who are labelled 'learning disabled' exhibit a disability, not because of anything wrong with their perception, synapses, or memory, but because they have been seriously 'mistaught'¹⁰¹. Still it is not clear that there is any relationship between poor instruction and learning disabilities, evidence shows that with appropriate, intensive and systematic teaching many students can be remediated. One cannot simply conclude that learning disabilities are caused due to inadequate instructions.

1.6. PREVALENCE OF SPECIFIC LEARNING DISORDER

The term '*prevalence*' of Learning disabilities usually refers to the estimated population of people who are having Learning disabilities at any given time. The prevalence of Learning Disorders ranged from 2 percent to 10 percent³⁸, which increased to 5 to 15 percent² across the academic domains of reading, writing and mathematics among the school-aged children. Specific learning disorder has been found more common among males when compared to females with ratios ranging from 2:1 to 3:1². United Nation's estimates about 40 million people worldwide are learning disabled and the prevalence of learning disability is alarming and it will increase to 60 million by the century end¹⁰².

The prevalence of SLD is presented in the following order:

- 1.6a. Prevalence of SLD Internationally
- 1.6b. Prevalence of SLD in India
- 1.6c. Prevalence of SLD with impairment in reading (Dyslexia)
- 1.6d. Prevalence of SLD with impairment in written expression (Dysgraphia)
- 1.6e. Prevalence of SLD with impairment in mathematics (Dyscalculia)

1.6a. Prevalence of Specific Learning Disorder Internationally

Early research in the USA estimated 15 to 20 percent prevalence of learning disabilities among children from first grade and can double among the rural and poverty-stricken areas¹⁰³. A study by Myklebust & Bushes (1969) reported 7 to 8 percent¹⁰⁴, while Meier (1971) reported 15 percent prevalence of learning disabilities¹⁰⁵. In another study, Bryant & McLoughlin (1972) reported higher incidence rate (3 to 28%) of learning disabilities¹⁰⁶ and in order to prove the above study Wissink (1972) surveyed 39 school-age children and found the incidence to be less than 5 percent¹⁰⁷. Kirk and Gallagher, 1979 guessed the incidence of learning disabilities between 1 to 3 percent¹⁰⁸, while it was much higher in another study by Learner (1985) who estimated 1-30 percent prevalence of learning disabilities among school population¹⁰⁹.

The Ministry of Education (MOE), Singapore has indicated that children with learning disabilities constitute at least 5 percent of the entire student population (Ministry of Education, 2004). Among the student population, MOE estimated that there 3 to 5 percent of students with dyslexia, and that there are another 0.5% of students with autism¹¹⁰.

Extrapolation of Prevalence Rate of Learning disabilities to Countries and Regions are only estimated and may have limited relevance to the actual prevalence of Learning disabilities in any region is been presented in the following table 3.

Table 3 - Extrapolated prevalence rate for learning disabilities to the populations of various countries and regions

Country/Region	Extrapolated Prevalence	Population Estimated Used
USA	4,966,230	293,655,405 ¹¹¹
Canada	549,765	32,507,874 ¹¹²
Britain (United Kingdom)	1,019,283	60,270,708 for UK ¹¹²
Bangladesh	2,390,316	141,340,476 ¹¹²
China	21,965,804	1,298,847,624 ¹¹²
India	18,012,222	1,065,070,607 ¹¹²
Indonesia	4,032,660	238,452,952 ¹¹²
Japan	2,153,425	127,333,002 ¹¹²
Pakistan	2,692,290	159,196,336 ¹¹²
Russia	2,434,855	143,974,059 ¹¹²
Australia	336,766	19,913,144 ¹¹²
New Zealand	67,542	3,993,817 ¹¹²
Afghanistan	482,216	28,513,677 ¹¹²
Egypt	1,287,279	76,117,421 ¹¹²
Iran	1,141,598	67,503,205 ¹¹²
Iraq	429,130	25,374,691 ¹¹²
Saudi Arabia	436,254	25,795,938 ¹¹²
Turkey	1,165,117	68,893,918 ¹¹²
Brazil	3,113,474	184,101,109 ¹¹²
Ethiopia	1,206,427	71,336,571 ¹¹²
South Africa	751,702	44,448,470 ¹¹²

The Health Statistics for US Adults had reported 7.7 percent of children to have a learning disability in the year 1991¹¹³. The UNESCO (2005) records of European countries, reported the percentage of students learning in special schools ranges between 2.5 to 4.5 and 10-15 percent of the school-age population are in special education needs, which include defects of speech, major behavioural problems and various forms of learning disabilities¹¹⁴. Almost 3 million children (ages 6 through 21) have some form of learning disability and are receiving special education in school¹¹⁵. The 29th Annual Report of the U.S. Department of Education, 2010, stated as many as 1 out of every 10 children had learning disability¹¹⁶. Pierangelo R and Giuliani G (2010) found that out of 5.7 million school-aged children of which 42 percent of students had some form of disability¹¹⁷, while World survey report (2011) estimated approximately 5 percent of children have developmental issues in listening, writing, reading, talking and in mathematical concepts¹¹⁸. In another study, it was 4.5 percent students in schools were identified having learning disorders¹¹⁴.

1.6b. Prevalence of Specific Learning Disorder in India

In the multilingual context in India, Specific Learning Disabilities (SLD) remains as an unrecognized category and still at emerging level^{119,120}. Research related to the field of learning disability is being carried out very recently¹²¹. In a study conducted by National Institute of Mental Handicap, Hyderabad, India reported four percent incidence of learning disabilities¹²², while another survey conducted by the Institute of Neurology, Kerala (1997) reported 10 percent prevalence¹²³. The National Sample Survey Organization (1981) studied the disabled population and found 3.6 million children with learning disabilities of the population (12.59 million)¹²⁴. Dr. Chawla (1985) Psychiatrist from All India Institute of Medical Science, New Delhi found six

percent of primary school children had characteristics of brain-injury resulting in a variety of learning problem¹²⁵. Agrawal et al (1991) reported 13 percent prevalence of SLD¹²⁶, whereas Shah et al (1994) reported the prevalence between two to ten percent¹²⁷. In another study by Kapur (1995), the incidence of learning disability in school children varied from nine to thirty-nine percent¹²⁸, but a study conducted by Karande (2008) reported prevalence between five to fifteen percent¹²⁹.

The Census of India (2001) reported 2.1 percent¹³⁰ of the prevalence rate of disability which has increased to 2.6 percent in the year 2012¹³¹. In a study conducted by Dilshad (2005-2006) reported that the total prevalence of learning disability was 10 to 12 percent among primary school children in the selected school and that boys had two to four times more learning disability than girls¹³². Whereas the Indian survey in 2009 reported 13 to 14 percent of all school children suffer from learning disabilities, which indicate an increase in learning disabilities among school children¹³³. In few recent studies conducted by Mogasale V et al (2011) and Dhanda & Jagawat (2013) showed that the prevalence of SLD to be 15.17¹³⁴ and 12.5 percent¹³⁵ respectively primary school children. From the literature, it is found that approximately 10-14 percent of the 416 million children in India have SLD^{136, 137, 138}. Researches carried out in the various states of India stated that 'in every average-sized class, at least, five students were likely to have the Specific Learning Disability'¹³⁹.

There is no systematic attempt has been made to estimate the prevalence of Specific Learning Disorder in school children in National, State or District or in Metropolitans levels. According to the Census of India (2011), 2.68 crores (2.21% of the whole population) people are reported to have a disability of different forms, affecting 56

percent male and 44 percent females. It includes individuals with a visual disability, hearing disability (both are the largest group), Speech, Movement, Mental Retardation, Mental Illness, Any other (includes Autism, Epilepsy, and Learning disability) and Multiple Disability¹⁴⁰.

Table 4 - Number of people with disabilities as per census 2011¹⁴⁰

Type of Disability	Persons	Males	Females	In percent
Total	2,68,10,557	1,49,86,202	1,18,24,355	2.2
In Seeing	50,32,463	26,38,516	23,93,947	18.77
In Hearing	50,71,007	26,77,544	23,93,463	18.9
In Speech	19,98,535	11,22,896	8,75,639	7.45
In Movement	54,36,604	33,70,374	20,66,230	20.27
Mental Retardation	15,05,624	8,70,708	6,34,916	5.61
Mental Illness	7,22,826	4,15,732	3,07,094	2.69
Any Other*	49,27,011	27,27,828	21,99,183	18.37
Multiple Disability	21,16,487	11,62,604	9,53,883	7.89

* includes learning disability

Among the types of disability, 18.37 percent of individual's ages between five to nineteen years are in the 'any other disability' which includes autism, epilepsy and learning disability, affecting more males than females. In Tamil Nadu among one million people with disability, 2.02 percent of the individuals are in any other disability, while in Chennai it is 27.92 percent among a population 90,064 individuals and in Thiruvallur it is 28.13 percent among 74,549 individuals with disabilities. The Census India (2011) does not provide the exact number of people affected by learning disability^{140, 141}. Children with delayed milestones have been diagnosed with attention deficit disorders, brain dysfunction, sensory integration issues, dyslexia, dyspraxia, and dyscalculia. The above information relates to the prevalence of Specific learning disorder in India and the West.

1.6c. Prevalence of Specific Learning Disorder with impairment in reading (Dyslexia)

The prevalence of Reading Disorder in the United States was estimated at 4 percent among school-age children³⁸. The epidemiological studies reports comparable prevalence rates of four to nine percent in reading disorder². In a study by Roongpraiwan et al (2002) reported the prevalence of dyslexia among students was 6.3 percent and probable dyslexia was 12.6 percent with a ratio of 3.4:1 among boys and girls¹⁴². Snowling et al (2003) study reported in the high-risk group, 66 percent had reading disabilities at the age of 8 years when compared with 13 percent in the control group¹⁴³. Leila Sedaghati et al (2011) reported the incidence of dyslexia in all grades was 10 percent with overall incidence was 66 percent among male and 34 percent among female students¹⁴⁴. In another study results revealed that the prevalence of dyslexia was 3.9 percent in Qianjiang city and the gender ratio (boys to girls) was nearly 3:1¹⁴⁵. There was high prevalence of dyslexia seen among the boys and this increase was actually reflected towards school referral bias. This was followed in a study by Shaywitz et al (1990) who found a research-identified incidence of reading disability of 8.7 percent of boys and 6.9 percent of girls, but in a teacher-identified incidence of the same population, however, identified 13.6 percent of boys and only 3.2 percent of girls with dyslexia. The bias occurred due to more reports of behavioural issues were observed in the classroom among boys¹⁴⁶.

Reading disability in the form of deficits in phonological awareness is the most prevalent type of learning disability and affects approximately 17 percent of school-age children to some degree¹⁴⁷. The argument among researchers was that the current prevalence rate is excessive and use of vague definition which in turn leads to an

inaccurate percentage. On the other hand, research efforts to identify early indicators of SLD in basic reading skills have concluded that virtually all children scoring below the 25th percentile on standardized reading tests can meet the criteria for having a reading disorder⁸¹. Lack of a universal definition of dyslexia, it is difficult to arrive at a consensus on the incidence of the disorder from the literature. Until a universally agreed-upon definition is found, the exact incidence of dyslexia will be difficult to determine. The DSM-V (2013) had given clear-cut criteria for identification of SLD and its domain². The literature review in the field reveals the variety of definitions prevail for the single term dyslexia. The term Specific Reading Disability, Reading Disorder, Reading Disability, Reading Disorder and Specific Reading Difficulty are often interchangeably used for dyslexia¹⁴⁸.

There has been no study done separately on the incidence of SLD with impairment in reading (dyslexia) in India. The precise prevalence of this disability is not known due to the absence of a national study. However, it is generally known that the number is pretty high. The earlier studies conducted by Mittal et al (1977) reported SLD with impairment in reading (dyslexia) among the Indian children ranged between 2 to 18 percent¹⁴⁹, which was only 3.9 percent in a study conducted by Tomblin et al (1997)¹⁵⁰. There is an increase in SLD with impairment in reading (dyslexia) among Indian school children, as the study conducted by Dhanda & Jagwat (2013) reported 21.26 percent¹³⁵, which was 11.2 percent¹³⁴ in a study conducted by Mogasale V et al (2011). SLD with impairment in reading (dyslexia) is considered as one of the most common learning disability among all students with specific learning disorders, as it affects 70 to 80 percent school children¹⁵¹.

1.6d. Prevalence of Specific Learning Disorder with impairment in written expression (Dysgraphia)

It is difficult to establish the prevalence of written expression because many studies focus on the prevalence of learning disorders in general without separating other specific disorders such as Reading, Mathematics or Written Expression. Disorder of written expression is rare when not associated with other learning disorders³⁸. There have been no epidemiological studies on the incidence of writing disorder in the United States and very few studies directly related to prevalence or other epidemiologic characterizations of writing disorder in general populations^{66,67,65}. Lyon, et al. (1996) had estimated the true prevalence of dysgraphia between 8 to 15 percent among the school population¹⁴⁷. Eslami et al (2014) reported the lowest prevalence rate of writing disability (4.5%) among a sample of 793 primary school children from Kerman city¹⁵².

Research related to the prevalence of SLD with impairment in written expression (Dysgraphia) was first reported by Shah, B. P. et al (1981) with 14 percent¹⁵³. Comprehensive studies carried out by Mogasale V et al (2011); Dhand and Jagwat (2013) and Martin et al (2013) found the prevalence of SLD with impairment in written expression (dysgraphia) was 12.5¹³⁴, 22.30 percent^{135,154} respectively among school children. The study also presented all the indicators of dysgraphia with the most prevalent indicator was ascending / descending / line fluctuating (53.6%). When the indicators were correlated to gender, males showed a significant difference in most of the them¹⁵⁴. In the following year, Martina et al (2014) reported 17 percent of school children had a problem in written expression (dysgraphia)¹⁵⁵.

1.6e. Prevalence of Specific Learning Disorder with impairment in mathematics (Dyscalculia)

Prevalence of SLD with impairment in mathematics (Dyscalculia) has been estimated at approximately one in every five cases of Learning Disorder. The incidence of dyscalculia was one percent³⁸ and had increased to three to seven percent² among the school population.

The earliest study by Kosc (1974) found the prevalence of 6.4 percent among children of schools population in Bratislava⁷¹, while McLeod & Armstrong (1982) reported 26 percent of their population experienced selective impairment in mathematics¹⁵⁶. Fletcher and Loveland (1986) estimated 18 percent of their population evidenced specific deficits in mathematics¹⁵⁷. Lewis et al (1994) found the prevalence of dyscalculia to be 1.3 percent among children aged 9-10 years¹⁵⁸. Geary and Hoards (2005) reported 5-8 percent prevalence of mathematical disorder using the 30th percentile criterion¹⁵⁹. In many epidemiological studies, researchers have found a higher incidence of mathematical difficulties among boys^{160,161 162 163}.

Fleishner, et al 1994 study indicated approximately six percent of the school population has difficulties in mathematics which cannot be attributed to low intelligence, sensory deficits, or economic deprivation⁷⁵. Many students have difficulty in acquiring and using mathematical skills. About six to seven percent of the students in general education classes show evidence of a serious mathematics difficulty. Approximately 26 percent of students with learning disabilities exhibit problems in the area of mathematics⁷⁶.

Countries like America, Europe and Israel show the prevalence of developmental dyscalculia to be about 3 to 6.5 percent¹⁶⁴. Koumoula et al (2004) epidemiological study derived on school population in Greece showed the prevalence of 6.3 percent¹⁶⁵. Barbaresi (2005) found that cumulative incidence of dyscalculia among age 19 years varying from a low of 5.9 to a high of 13.8 percent depending on the mathematics learning disorder definition¹⁶³. Dyscalculia prevalence studies have been performed in many countries using different criteria¹⁶⁶. Three percent had mathematical LD¹⁶⁷ in another study it was 13.9 percent¹⁵² and in a much recent study it was 6.0 percent¹⁶⁸ school children had an arithmetic disorder. The frequency of dyscalculia between genders does not exist, but in general, it is thought that boys perform mathematics better than girls¹⁶⁹. According to teachers, gender has no influence on success in mathematics¹⁶⁵. Most prevalence studies of developmental dyscalculia point to equal rates between the genders^{158, 164}.

In India, not many studies have been carried out, but few studies show an increase in the prevalence of dyscalculia among school children. Shah and Bajaj (1994) found the prevalence of dyscalculia was 7.5 percent¹²⁷, in another study by Gowaramma (2000) too found the same percentage of Lewis (1994) in her study^{171, 158}. A study conducted by Karande et al (2007) reported 74 percent¹⁷² and the much recent studies reported 10.5 percent; 15.54 percent and 40 percent prevalence of dyscalculia^{134, 135, 155}.

The following table gives the prevalence of dyscalculia studies carried out in most part of the countries by various authors.

Table 5 - Summary of Developmental Dyscalculia prevalence studies by different authors from different countries¹⁷⁰

First author	Country	Sample	Prevalence	Criteria
Kosc (1974)	Slovakia	375	6.4%	≤10% + control
Badian (1983)	US	1476	3.6%	<20%
Klauer (1992)	Germany	546	4.4%	<2 SD
Lewis et al. (1994)	UK	1056	1.3%	<16% + control
Gross-Tsur et al (1996)	Israel	3029	6.5%	2 year performance lag + control
Badian (1999)	US	1075	3.9%/2.3% ^a	<20%/<25% ^a
Hein et al. (2000)	Germany	181/182	6.6%	<17%/<25% + control
Ramaa and Gowramma (2002)	India	251/1408	5.98%/5.54% ^b	Exclusionary criteria/ 2 year Performance lag
Mazzocco & Myers, 2003	US	210	9.6% ^a	≤1 SD/<10% + control
Desoete et al. (2004)	Belgium	3978	2.27%/7.7%/6.59% ^c	≤2 SD + control + RTI
Koumoula et al. (2004)	Greece	240	6.3%	<1.5 SD + control
Barbaresi et al. (2005)	US	5718	5.9%/9.8%/13.8% ^b	Regression formula; discrepancy formula <25% + control
Barahmand (2008)	Iran	1171	3.8%	≤2 SD + control
Dirks et al. (2008)	Netherlands	799	10.3%/5.6% ^b	<25%/<10% + control
Geary (2010)	US	238	5.4%	≤15% + control
Reigosa-Crespo et al (2011)	Cuba	11,652/1966 ^d	3.4%	<15%/<2 SD ^d

Note. Where possible, reported prevalence estimates are for mathematics disability only. RTI = resistance to intervention.

a. Persistent DD.

b. Prevalence estimates when using the different criteria.

c. Prevalence estimates for the Second, Third and Fourth grades respectively.

d. Two stage diagnosis

1.7. EDUCATIONAL IMPLICATIONS OF SPECIFIC LEARNING DISORDER

Education is one of the most important aspects of human development. Every child should have the opportunity to achieve his or her academic and to grow up feeling competent and to be accepted in society. In India, children constitute one-third of the total population. A school is an ideal place in providing appropriate education to children of all ages, unfortunately, many schools fail to lend a sympathetic ear, as a result these children are branded as lazy, useless, unsuccessful and sometimes idiots¹⁷³.

Learning disability (LD) is real and it may block the nation's development process Samir Parikh (2009), a child psychiatrist who believes that dyslexia is not a disease, but it is a lifelong problem and challenges need to be overcome daily. However, he is optimistic and argues that with proper diagnosis, appropriate education, hard work, support from family, friends, teachers can definitely help an individual lead a successful life¹⁷⁴. Parents of SLD affected children often find themselves confused with a range of problems as their children appear to be intelligent but come across different kinds of obstacles in school. Karanth, (2003) pointed out that in India; the issue has gained salience only during the last decade. Though limited epidemiological studies have been carried out, but one can find the increase in demand for remedial support / services as there is an increase in identification of children with SLD¹⁷⁵.

1.7a. AWARENESS OF SPECIFIC EARNING DISORDER AMONG PARENTS AND TEACHERS

Parents and teachers are more concerned about the children's learning problem. Just through mere observation parents and teachers should not conclude learning problem, but a formal evaluation is necessary. This invisible disability often creates intolerance towards the child by family members and general public¹⁷⁶. When it comes to child's disability or academic performance parents initially respond to the diagnosis with mixed feelings and emotions¹⁷⁷. At times delayed and conflicting diagnoses often lead to delayed intervention; these conditions often heighten parental stress and cultivate negative family functioning^{176, 177,178}. Research indicates that parental reaction to the diagnosis of SLD is more pronounced than in any others areas of disabilities or medical conditions.

Parents need to understand that SLD is a lifelong disability and it is just not related or associated with academic problem (like reading, writing, spelling, mathematics), but it is also associated with motor activities (skipping, shoe lacing, jumping, hopping, buttoning). As SLD if lifelong parents find it difficult to accept it because the child with SLD may grow into an adult with SLD. India is a very traditional and culture orientated country, where the parents do not disclose their child issues with others even with their own family members. They associate any disability, with their past deeds, karma and also undergo a deep feeling of guilt. This stigma should be broke and parents should work as a coach in training children. Parents are the best judge in identifying strength and weakness of children. They need to plan a schedule related to the academic difficulty such as reading, writing, spelling and mathematics and also pay attention to their behaviour. Parents should adopt the trial and error method in

order to decide the best method of learning as each child learns in a different way. SLD is unique to each child and so does the remedial measures.

Teachers play a primary role in teaching the concepts to the class. They address the class in a common and regular teaching style. There is a need for the teachers to understand and be aware of the learning problems that are exhibited by children at different class levels and observe their classroom behaviour (lacks peer interaction, no focus in academic, isolated, etc). Feagans and Mc Kinney 1981; McKinney and Specce (1983) have observed that children with learning disabilities often limit their interaction with the teachers^{179, 180}. Lack of knowledge and awareness among the teachers makes it difficult to identify children which result in poor performance and detainment. In this country, many classroom teachers in regular mainstream schools have limited knowledge of Specific Learning Disorder¹²⁹ and inadequate knowledge leads to negative attitudes toward persons with disabilities¹⁸¹.

Poplin 1984, noted that teachers often ignored the talents of the child with SLD as these children are generally creative and talented. Being identified with SLD these children are referred for remedial services which focus on their weakness¹⁸². In a regular school set up teacher repeatedly coaches the child in their academics and not actually teaching the strategies for improving learning. Eg. If a child is weak in mathematics or language she/he usually attends remedial class in school during the music or art class which may be of child's interest. When the children miss the class of their interest, they tend to retaliate by exhibiting behavioural issues. In order to bring children into the main stream, they should be given remedial intervention by a special educator who will focus both on strengths and weakness of the children.

In other countries, various studies on the subject found that teachers had low to moderate knowledge and awareness about learning disabilities^{183, 184, 185}. Indian studies have revealed that the teachers had an average level of knowledge about specific learning disabilities, irrespective of their gender and teaching experience^{186, 187}. Furthermore, the teachers' age, years of teaching experience and the nature of the school were not related to knowledge and awareness about learning disabilities among them^{188, 189}. However, teachers with higher education qualifications exhibited better awareness¹⁹⁰. Lack of awareness and acceptance among parents and teachers are the reasons why these children are most often referred to special school¹⁹¹. Schonell and others have suggested that these children with a learning disability should be admitted in regular school for a better type of learning than the special school¹⁹². A study done by Snider and Busch (2003) gave a contradictory statement that claims 40 to 60 percent of children with SLD were referred by teachers¹⁹³. The same was observed in the current study while interacting with teachers. As parents conceal the information about the child's difficulty or deny saying nothing is wrong with my child. Disorders like ADHD and SLD are prevalent in India; however, one of the major obstacles is a lack of awareness of this disorders¹⁹⁴.

Parents and Teachers are in the best position to identify children with SLD. They are unaware of the learning problems of the children. Parents and teachers have to be educated regarding these problems, so that they can help to bring some improvement in the academic performance of children. In this new era, there has been a constant increase in the awareness about the hidden disability, Specific Learning Disability. The recent Hindi movie *Taare Zameen Par* ("Stars on the Earth") has sensitively and accurately depicted the plight of an 8-year old boy battling SLD¹. The movie has

brought out the plights of the Specific Learning Disability child in a mainstream school without getting proper recognition and accommodations into the limelight. The movie has sensitized the problems of the SLD students to the public. Still the knowledge about this hidden disability is in the lower level only. First, there is a need to improve the knowledge of classroom teachers, parents and the general public about SLD.

The Census of India 2011 has included the specific learning disability in the 'Persons with Disability Act' but does not give the exact number of children with SLD in the country¹⁴⁰. The government feels that having such a huge population it is difficult to draw the exact percentage of SLD among the disabled persons. In India, the learning disabled children are not identified using reliable tests. We do not have a clear idea about incidence and prevalence of learning disability in India. Therefore, the present study is an attempt to assess the prevalence of SLD and its domain like reading, writing and mathematics and also ascertain the SLD awareness and knowledge among parents and teachers.

1.8. NEED FOR THE STUDY

The above statistics and research findings show that there is no clear idea about the prevalence of Specific Learning Disorder in India^{18,119,120} and most of the researches are restricted to a particular class level and language. Diagnosis of SLD is relatively new to the Indian context, especially in Tamil Nadu, as not many studies have been conducted. In India, there is different school educational system following various pattern of the syllabus. There are two patterns of the education system in Tamil Nadu namely Central Board of Secondary Education (CBSE) and State Board (SB) which

includes Matriculation and Anglo-Indian. This is presently called as “Samacheer Kalvi” controlled by the Directorate of School Education under the Tamil Nadu State Government¹⁹⁵. The current education system requires a child to learn English as a medium of instruction and state language (State Board), whereas in CBSE schools the child needs to learn English as a medium of instruction along with Hindi and regional language. Keeping the above information in mind, the researcher conducted a comprehensive study to find the prevalence of Specific Learning Disorder among rural and urban children studying in Central Board of Secondary Education (CBSE) as well as State Board (SB) schools, in different subjects such as English, Tamil and Mathematics. The study also focuses on the awareness about Specific Learning Disorder among their parents and teachers because research pertaining to awareness is also limited.

REVIEW OF LITERATURE

A comprehensive review of literature is important for a good research as it will provide more information for the researcher to design and analyze the research work. The researcher has taken maximum efforts to go through various journals and publications such as Journal of Learning Disabilities, Learning disabilities Quarterly, International Journal of Scientific and Research Publications, Indian Journal of Research, Sage Publications, PUBMED, American Academy of Pediatrics. Research pertaining to the prevalence of SLD and its awareness among parents and teachers was limited; the initiative was made to collect enough information with regard to the current research.

KEYWORDS: Prevalence, national estimates, Specific Learning Disability, Learning Disability, Learning Disorder, Learning Disabilities, Dyslexia, Dyscalculia, Dysgraphia, writing disorder, reading disorder, mathematic disorder, difficulty, school children, epidemiological, population, county, primary class, rural and urban, awareness, parents, teachers, knowledge, language, special needs education, impairment, academic, scholastic backwardness, educators, developmental disorders, percentage, census, parents, mother, father, family, children, identification, Qualification, Education, spelling difficulty, handwriting, classroom, school, institutions, Grades, Heredity, inclusive education, policies, law, government, SLD, LD.

The review of literature is arranged under following sub-heading.

2.1. International Studies

- a. Prevalence of Specific Learning Disorder (SLD)
- b. Domains of Specific Learning Disorder with impairment in Reading, Written Expression and in Mathematics
- c. Awareness of Specific Learning Disorder among parents
- d. Awareness of Specific Learning Disorder among teachers

2.2. Indian Studies

- a. Prevalence of Specific Learning Disorder (SLD)
- b. Awareness of Specific Learning Disorder among parents
- c. Awareness of Specific Learning Disorder among teachers

2. 1. INTERNATIONAL STUDIES

2.1a. Prevalence of Specific Learning Disorder (SLD)

The prevalence of SLD has increased over a period of time² this may be due to the availability of various assessment tool and the services being offered to children. Many studied were carried out after the symptom and diagnostic criteria provide were published by the DSM–IV, 2000⁴² for various mental health related disorders and ICD-10³⁶.

The prevalence of Specific Learning Disorders (SLD) studied among in Ogliastra, a high genetic homogeneity area of the island of Sardinia, Italy. The screening was carried out for 2 consecutive years among 49-second class students (24 in the first year and the 25 in the second year of the study). A sample of 610 pupils (293 females

and 317 males) attending second grade were administered on "RSR-DSA screening tool and questionnaire for the detection of learning difficulties and disorders. Among the sample (83 subjects) were at the risk and enhancement training program for 6 months was conducted. After the reassessment, it was found that the prevalence of SLD was 6.06 percent and dyslexia was 4.75 percent¹⁹⁶. The total sample manifested this disorder either in isolation or in co-morbidity with other disorders. According to the first national epidemiological investigation carried out in Italy, the prevalence of dyslexia was 3.1 to 3.2 percent, which is lower than the prevalence rate obtained in this study. Result together with the presence of several cases of SLD in isolation (17.14%) and with a 3:1 ratio of males to females diagnosed with an SLD¹⁹⁶.

In another study by Fortes et al investigated the prevalence of SLDs and correlated their co-morbidities among samples of 1618 school children and adolescents from second to sixth grades living in four different cities in Brazil. They were administered on national test for academic performance comprising of reading, writing and mathematical ability, while K-SADS-PL was applied to the primary caregiver. The prevalence rates of SLDs were 7.6 percent for global impairment, 5.4 percent for writing, 6.0 percent for arithmetic and 7.5 percent for reading impairment. Attention- deficit / hyperactivity disorder (ADHD) was the only co-morbidity which was significantly associated with SLD with global impairment ($p = 0.031$), while Anxiety disorders and ADHD were associated with SLD with arithmetic impairment. There was a significant differences detected in prevalence rates among cities, and several socio-demographic correlates (age, gender, IQ, and socioeconomic status) among the global impairment sample. Heterogeneity in prevalence rates of SLD

according to geographic regions and SLD with global and arithmetic impairment was significantly associated with psychiatric co-morbidities¹⁶⁸.

The prevalence study by Moll et al on the rate of gender ratio for isolated and combined learning disorders such reading, written expression and mathematics² was conducted among 1633 German-speaking students from 3rd and 4th grades of the primary school. They found co-morbid learning disorders occurred frequently as isolated learning disorders, even when stricter cut-off criteria were applied. Forty-two percent had isolated and 58 percent had combined reading disorder while 60 percent and 40 percent had isolated and combined spelling disorder, 62 percent and 38 percent had isolated and combined arithmetic disorder respectively. Reading and spelling deficits differed with respect to their association with arithmetic problems. Deficits in arithmetic co-occurred more often with deficits in spelling than with deficits in reading. There was decreased in the co-morbidity rates for arithmetic and reading which was higher arithmetic and spelling irrespectively. They suggested that the processes underlying the relationship between arithmetic and reading might differ from those underlying the relationship between arithmetic and spelling. More boys showed spelling deficits while more girls were impaired in arithmetic. No gender differences were observed for isolated reading problems and in the combination of all three learning disorders¹⁹⁷.

The prevalence of learning disabilities among primary school students (N=793) in Kerman city was 40.74 percent with a significant difference between boys and girls. The sample selected through cluster sampling technique was assessed on intelligence, mathematic, reading, writing tests and questionnaire. Higher percentage of students

had reading disability (36.9%), followed by Math disability (13.9%) and only a small percentage had writing disability (4.5%). They also found significant difference among boys and girls in math disability, writing and reading disability¹⁵².

In a cohort sample of 287 (first & third grade), primary school children with failures academic were carried out in Tunisia. They were initially screened by their class teachers on achievement and academics and later underwent a multidisciplinary assessment which consisted of general medical examination, psychiatry, neurology, speech and psychology (cognitive). Only 180 students underwent complete assessment and it was found that the prevalence of SLD was 32 percent. The most common SLDs were dyslexia and dyscalculia and these children with SLD were from disadvantaged social groups¹⁹⁸.

In the year, 2013 Archibald studied the learning profiles of a larger school-age sample from 34 schools (including 5 rural schools) in the southwest region of Ontario, Canada. Children studying in senior kindergarten to 4th grade with a corresponding age range from 4 years 10 months to 10 years 10 months. Approximately 5967 consent forms were distributed of which 1605 returned the form and only 1387 participated in the study. All the participants underwent a battery of standardized language, reading, math phonological awareness, intelligence and working memory tests. Both general learning profiles reflecting good or poor performance across measures and specific learning profiles involving weak language, weak reading, weak math, or weak math and reading were observed. The above four profiles characterized 70 percent of children with some evidence of a learning disability. Low scores in phonological short-term memory characterized clusters with a language-based

weakness whereas low or variable phonological awareness was associated with the reading (but not language-based) weaknesses. The low math only group did not show these phonological deficits. Findings suggested different etiologies for language-based deficits in language, reading, and math, reading-related impairments in reading and math, and isolated math disabilities¹⁹⁹.

A descriptive cross-sectional study by Hsairi et al was carried out to determine the incidence, etiology and management of learning disorders in the region of Sfax among 304 children who have been assessed by their teachers with academic difficulty. A multidisciplinary assessment including a neurological, intelligence and language assessment were performed among 209 children showed that 21.3 percent of children in the region Sfax are affected with learning disorders affect. The frequency of specific learning disorder is estimated at 10.3 percent, with reading disorder 5.9 percent, dyscalculia 2.4 percent, reading disorder associated with dyscalculia two percent and Non-specific learning disorders were found in 11 percent of the children. Etiologies in this group were dominated by mental retardation (2.1%), inappropriate education (2.3%). They revealed high frequency of learning difficulties and distinguishing between specific learning disabilities and non-specific learning disorders secondary to neurological or precarious socio-economic conditions. However, the profile and severity of specific learning disorders could not be studied due to the lack of standardized Arabic tests in Tunisia. In countries with a lack of professional and specialized unit care as in Tunisia, reading interventions in school should be proposed. Only children with remaining difficulties after this training will be sent to specialized professionals²⁰⁰. In another Arab country (Iran) the prevalence was found to be 11.40 percent of the elementary schools students and also indicated

that the students had problems with memory retention, visual acuity, and hearing memory that correlated with the cause of learning disabilities²⁰¹. They randomly selected sample of 600 students from third, fourth and fifth grades of the elementary schools. Teacher's checklist and test notebooks of the students were considered apart from formal assessments (Wisc, Wepman and Mariyan Framstick tests along with tests on reading, writing and math)²⁰¹.

The association between learning difficulties (LDs), behavioural and emotional problems was studied among 9432 children of 8-year-old in the Northern Finland (Birth Cohort 1986) by Taanila et al. Teachers were asked to score the Rutter scale (RB2) and with questions about whether children had difficulties in reading, spelling and mathematics. It was found that 21.4 percent had one or more learning difficulties (LDs) while 12.3 percent had verbal, 3.0 percent had mathematical and 6.0 percent had combined LDs. Boys and girls with LDs had behavioural problems in a ratio of 3.1: 3.9 while emotional problems were in 3.1:5.3 ratios. They also found that boys and girls verbal difficulties were associated with behavioural and emotional problems, whereas mathematical difficulties were associated with behavioural problems in boys and with emotional problems in girls. Divorced and reconstructed family types were significant risk factors for LDs and behavioural problems, whereas a lifelong one-parent family type was a risk factor for behavioural problems. Other risk factors of LS are parental education and SES. Attention should be paid to children whose families are facing adverse circumstances as it affects their preschool education, in order to support learning and school attendance¹⁶⁷.

The lifetime prevalence of learning disability by socio-demographic and family functioning characteristics in US children was studied by Altarac and Saroha (particularly attention paid to the children with special health care needs). Using data from the National Survey of Children's Health, the lifetime prevalence of learning disability was calculated. Bivariate and multivariate statistical methods were used to assess the independent associations of selected socio-demographic and family variables with a learning disability. The lifetime prevalence of learning disability in US children was 9.7 percent. Although the prevalence of learning disability was lower among average developing children (5.4%), but it still affected 2.7 million children compared with 3.3 million (27.8%) children with special health care needs. They concluded that prevalence of learning disability occurred in children with special health care needs and that it is also a significant morbidity in typically-developing children as well²⁰².

The prevalence of learning disabilities percentages vary greatly between states and within a state, depending on the criteria used to determine its eligibility. Lowest prevalence of 2.9% was reported in Kentucky while the highest prevalence of 7.35% was reported in Massachusetts. A study completed in Michigan compared the learning disabilities eligibility criteria and procedures for identification of the 57 regional education service agencies in the state (RESA). The results indicated that 21% of the RESAs had no written eligibility criteria or policies, the length of the written policies varied from one sentence to 112 pages, and the severe discrepancy formula score varied from 15 to 30 standard score points. If a student moves few miles into the next school district would no longer be considered to have a learning disability. Results also revealed that boys are 1.5 or 6 times more likely to be identified than girls. Boys

are far more likely to be identified as SLD despite the research suggesting an equal incidence of LD among girls and boys. These could be linked to possible medical, maturational, sociological and brain organizing factors²⁰³.

The study results by Yao and Wu revealed that prevalence rate of LD in Chinese children was 10.3 percent with significant differences between LD and normally learning children. Data underscore the fact that LD is a serious national public health problem in China. Good studying and living environments should be created for LD children²⁰⁴.

This is the only prevalence study that was carried out between urban (N=181) and rural (N=182) third-grade students selected from eight German School children using standardized academic achievement test. They found that 6.6 percent of the rural and 6.59 percent of the urban school children performed significantly worse in arithmetic than in their spelling tests. Since the diagnostic criteria for the Specific disorder of arithmetical skills and their significance are widely discussed, they attempted in the second step of their study to validate the diagnosis of the Specific disorder of arithmetical skills from a neuropsychological and medical viewpoint. For the validation clinical data, imaging and neurophysiologic studies, as well as a neuropsychological test of battery, were assessed. Nine and five of the children, respectively from urban and rural schools, were available for further evaluation. The majority of these pro-bands (n=10) had distinct arithmetic deficits, only three of them met the full diagnostic criteria of the ICD-10 for a Specific disorder of arithmetic skills. Later, data from both the studies were compared and strongly supported the clinical, neurological, neuropsychological and academic assessment of students

suspected with Specific disorder of arithmetic skills. They concluded that all professionals concerned with child care should be able to detect the conditions of children with acquired arithmetic skills and approach appropriately as early as possible²⁰⁵.

A study on Learning Disabilities was conducted by the National Institute of Child Health and Human Development, Bethesda, USA and it was found that approximately five percent of all public school students are identified with learning disability (LD). The prevalence of learning disability identification has increased considerably in the past 20 years. Children with relatively subtle linguistic and reading deficits require the expertise of a teacher who is well trained and informed about the relationships between language development and reading development. It was in 1995 that the United States Department of Education had taken an initiative to identify students with learning disabilities in public school. Children with a disability who were served under Individuals with Disabilities Education Act (IDEA) had increased to 198% from 52% between 1976-77 and 1992-93 periods, with a decreased in services offered to other disabilities like mental retardation, speech and language impairment²⁰⁶.

In 1990 Shaywitz, Shaywitz, Fletcher and Escobar reported that girls with SLD are underestimated, putting them at risk for academic, social and emotional challenges as teachers refer boys more often than girls for assistance prior to special education¹⁴⁶. It was Green, Clopton and Pope (1996) reported some factors that lead to significantly high references of boys as they tend to have more externalizing problems. Optimistic view was that girls will improve as they mature. The social expectation for academic learning was not consistently high and they exhibited passive behaviour such as

sitting, being calm, day dreaming etc., therefore, less likely to be identified than boys²⁰⁷.

The above studies indicate that in spite of studies being carried out in many countries with prevalence rate varying from country to country and within states too. Specific Learning Disorder is a common problem related to academic among school going children and SLD is not necessary related to language, socioeconomic status, type of school or geographical location.

2.1b. Domains of Specific Learning Disorder (SLD) with impairment in reading, written expression and in mathematics

Specific Learning Disorder with impairment in Reading - Dyslexia

Reading disorder which is commonly known as Dyslexia is one of the primarily studied and most common disorder of SLD affecting 80 percent of the school. While the incidence of dyslexia in school children in the USA ranges between 5.3-11.8 percent and previous studies believed that dyslexia affects boys primarily, but recent data indicate that boys and girls are affected equally. Reading disorder among school children in India had been reported between 2-18 percent¹⁴⁹. Epidemiological studies reported a comparable of 4-9 percent prevalence rates for deficits in reading². Another recent study reported 7.49 percent prevalence among children ages seven to nine years (N=120) studying in class two and three in primary school. The students were administered on The Burt reading test with a reading discrepancy of nine months and DST-J who were a risk for dyslexia. They also presented that there was no connection between parental demographic characteristics and dyslexia²⁰⁸ another study also

found that the gender, mother's education level and learning habits (active learning, scheduled reading time) were associated with dyslexia¹⁴⁵

This cross-sectional study was conducted in Qianjiang, a city in Hubei province, China. Two stages sampling strategy were applied to randomly select 5 districts and 9 primary schools. A sample of 6,350 students participated in this study and only 5,063 valid student questionnaires were obtained for the final analyses. Additional questionnaires (such as Dyslexia Checklist for Chinese Children and Pupil Rating Scale) were used to identify dyslexic children. The chi-square test and multivariate logistic regression were employed to reveal the potential risk factors to dyslexia. Results revealed that the prevalence of dyslexia was 3.9 percent and the gender ratio (boys to girls) was nearly 3:1¹⁴⁵.

Compton, et al. (2012) studied the cognitive and academic profiles associated with learning disability (LD) in reading comprehension, word reading, applied problems, and calculations. A final sample of 684 students beginning from 3rd to 5th grades were assessed on five cognitive dimensions (nonverbal problem solving, processing speed, concept formation, language, and working memory), and performance in the academic area was assessed three to four times among equal male and female participants. Results revealed that students with LD had difficulty in reading comprehension (8.5%), word reading (10.4%), applied problems (8.2%) and calculation (13.9%). Finally, students with or without LD in academic areas were classified and they discussed the potential connections between reading and mathematics LD²⁰⁹.

Another cross-sectional study was carried out among the randomly selected 94 fourth grade elementary school from Friuli Venezia Giulia, a Region of North Eastern Italy. The study was carried out through 3 consecutive levels of screening that was carried out at school and the third level screening was at the Neuropsychiatry Unit of Mother and Child Hospital. Results showed that out of 1774 children (aged between 8 to 10 years) of which 1528 parents gave participation consent and after exclusion criteria only 1357 pupils made the final sample. The prevalence of dyslexia in enrolled population ranged from 3.1% to 3.2% depending on different criteria adopted. In two out of three children with dyslexia, the disorder had not been previously diagnosed. The study showed that dyslexia was largely underestimated in Italy and underlines the need for reliable information on prevalence; in order allocate better resources both to Health Services and school children²¹⁰.

The prevalence of reading disorder among 200 first to fifth grade elementary school students (both boys and girls) who were selected through multistage random sampling method was carried out by *Leila et al.* The sample was administered on the Inventory Reading Test to diagnose reading disorder and the results revealed highest prevalence of reading disorder in the first grade male students (25%), and the lowest in fifth grade female students (0%). The incidence of dyslexia in all grades was 10 percent with overall incidence was 66 percent among male and 34 percent of female students. Reading disorder was more prevalent among male than female students and found that the Inventory Reading Test was a satisfactory tool for rapid diagnosis of reading disorder¹⁴⁴.

Prevention programme at kindergarten level can also promote children's ability to acquire reading and spelling skills. A study by Schulte-Korne in Munchen was carried out on the basis of selective literature review and the guidelines of the German Society of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy. The result showed that 40 to 60 percentages of dyslexic children had psychological manifestations, including anxiety, depression, and attention deficit. He suggested that diagnosis of dyslexia should establish with the aid of multi-axial classification system which will help in the treatment of dyslexia²¹¹.

A very large and representative sample of students from third and fifth grade (1997 to 2006) of New South Wales schools in Australia and were administered on Basic Skills Test (BST) for reading problem. Poor readers were defined as students who scored in the lowest BST bands, Bands 1 and 2. Average boy/girl ratios for third-grade students were 1.66:1 (Band 1) and 1.44:1 (combined Bands 1 and 2) and for fifth-grade students were 2.26:1 (Band 1) and 1.99:1 (combined Bands 1 and 2). They found that their study confirmed earlier research of more boys experienced reading problems than girls²¹².

In 2008, Stefan investigated the cognitive subtype of dyslexia among 3rd-grade children selected from 21 primary schools in Germany. A sample of 642 parents agreed to allow their children to participate in the study but 104 children were selected for further examination and from which 97 children had completed data (4 excluded for no age norms). Students were group assessed for their reading abilities and further children with normal and deficient scores were assessed for their non-verbal intelligence, phonological awareness, auditory sound discrimination,

automatisation, magnocellular functions and visual attention. Results showed that among 93 children (48 girls, 45 boys) there were 45 dyslexics (24 girls, 21 boys) and 48 controls (24 girls, 24 boys) with a mean IQ of 108.4 among the dyslexic children. These results may inspire in the identification of dyslexia subtypes on the neurological and genetic level²¹³.

The main interest involved was to see the co-occurrence of word recognition and arithmetic disabilities and their possible relationship. Hence, the prevalence of SLD on the domains of reading and arithmetic disabilities was studied among a sample of 799 Dutch schoolchildren using standardized school achievement tests, scores of arithmetic, word recognition, reading comprehension, and spelling of child in fourth and fifth grade. Results show that 7.6 percent had combined reading and arithmetic disabilities and co-occurred more often than expected based on rates of the separate conditions. Children with combined reading and arithmetic disabilities seem to have more generalized achievement difficulties than single-deficit groups. It was found that difference in processes may be the underlying relationship between arithmetic and word recognition disabilities compared to the relationship between arithmetic disabilities with difficulties in spelling and reading comprehension²¹⁴.

Investigating the prevalence of reading disability among early elementary school children and impact of socioeconomic status (SES) were studied among a sample of 1020 second-grade children (476 girls and 544 boys) from 20 different schools. Approximately 1/3 of the children lived and were schooled in a high SES area, 1/3 in an intermediate SES area, and one final third in a very low SES area. Assessment of reading, writing and mathematical skills was conducted initially in small groups.

Children with suspected learning difficulties were further tested individually. Forty-two children of an equivalent age who repeated the first grade received similar individual testing. The average reading scores were in accordance with chronological age, without gender differences. Children from low SES schools had academic performances significantly lower than their peers. Boys exhibited superior arithmetic skills than girls. A significant reading delay was observed in 12.7 percent of children. The prevalence of poor reading was highly correlated with the area of schooling, varying from 3.3 percent in the high SES area to 24.2 percent in low SES area. The study concluded that higher rate of children from our sample with a significant delay in reading depended on the general socioeconomic environment. An understanding of the origin of such differences is mandatory for defining and coordinating preventive actions and appropriate interventions²¹⁵.

In United Kingdom study on Expressive versus Receptive language skills in specific reading disorder was carried out by Stojanovic and Riddell in a sample of 17 children with specific reading difficulty ages between 7 and 12 years. Children were administered a battery of two receptive and two expressive language measures and results showed that as the neuro-anatomical model would predict, the children scored significantly lower on tests of receptive than on tests of expressive language skills²¹⁶.

In 2002, Roongpraiwan and his team found the prevalence of dyslexia to be around 6.3 percent and probable dyslexia as 12.6 percent with a ratio of 3.4:1 among boys and girls. Four hundred eighty-six students from class first to six participated in the study and the dyslexia group showed lower Thai language scores than those of the normal group. Nearly 90 percent of the group showed positive soft neurological signs

and 8.7 percent showed co-morbid ADHD which was determined after administering the Raven's progressive matrices test. They suggested for appropriate test tool to identify reading difficulty among all children with learning problem¹⁴².

Bircheva, in the year 1999 conducted a study of reading and writing disorders in elementary school students with varying achievement in Bulgaria. A sample of 391 first and second-year students was selected with of whom 191 with low and 200 with excellent marks at school. The study revealed that serious reading and writing disorders were detected in 14.8 percent of all pupils. Disorders encountered in 29.3 percent of the children with low marks and in only one percent of those with excellent marks. Finally, it is concluded that dyslexia and dysgraphia-type of reading and writing disorders in primary school children are factors exerting unfavourable effecting academic performance at schools²¹⁷.

A sample of 133 Spanish children (85 male, 48 female) aged 8 to 13 years were divided into four groups according to IQ measured on Wechsler Intelligence Scale for Children-Revised (<80; 81—90; 91—109; 110—140) and into two groups based on reading level (LD and NLD). A lexical decision task was used and manipulated different word and pseudo word parameters were used by both groups. It was found that IQ does not explain the differences between children with LD and NLD children in lexical processing. It was also found that lexical and sub-lexical parameters have a greater influence on students with LD than NLD students, independent of IQ. In combination, the LD group had more difficulty in lexical processing, which was influenced by poor phonological skills²¹⁸.

Winzer in 1990 conducted a prospective study of children at family risk of Dyslexia in a followed the progress of 32-year-olds from the families with a history of reading disability during the early school years comparing them with children from families of similar socio-economic backgrounds with a negative history of dyslexia. Children at the age of 8 years were considered to be at high risk of reading disability²¹⁹.

Specific Learning Disorder with impairment in Written Expression - Dysgraphia

SLD with impairment in written expression otherwise known as Dysgraphia and it is another form of learning disorder that occurs among school children as writing starts as early as 2 years in different countries following different syllabus. Research and investigation related to this disorder are least found in the literature.

Educational multimedia in dictation had a positive impact in improving dysgraphia in students with dictation difficulty. To prove this sample consists of 39 students selected through position sampling method from second grade of primary schools of Arak admitted during the 2011-2012 academic year and had dictation difficulty. The designated samples of 20 members were selected from experiment group and the remaining 19 members were under control group. Clinical interview, dictation test, and Wechsler Intelligence Scale for Children- Revised (WISC-R) were utilized to distinguish students with dictation difficulty from normal-progress students in learning disability centre. Dictation test for data compilation and Man-Whitney-Wilcoxon U-Test (MWW) data analysis were used. They found that the level of improvement of dysgraphia of those students who rely on educational multimedia in dictation has a positive statistical significance in comparison with those who rely on normal educational procedures²²⁰.

Martins, et al. explored the warning signs of dysgraphia among 630 sixth grade students from an elementary school using Analytical Dysgraphia Inventory. While 22 percent of the students who undertook the sample survey exhibited all indications of dysgraphia; the most prevalent indicator was ascending or descending or fluctuating lines (53.6%). When the indicators were correlated with gender, male respondents showed a significant difference. Among the warning signs of co-occurrences, dyslexia was the most prevalent indicator (22%). Since several indicators of dysgraphia were observed, the school children were advised to undergo additional screening for these signs, in order to implement early interventions¹⁵⁴.

Schwellnus, et al. studied the differences in handwriting kinetics, speed, and legibility among four pencil grasps after a 10-min copy task. A sample of 120 children participated in the study and after elimination, only Seventy-four students from grade 4 of the four metropolitan schools (equal boys and girls) completed handwriting assessment before and after a copy task. Grip and axial forces were measured with an instrumented stylus and force-sensitive tablet. Multiple linear regression was used to analyze the relationship between grasp pattern and grip and axial forces and results showed no kinetic differences among grasps, whether considered individually or grouped by the number of fingers on the barrel. However, when grasps were grouped according to the thumb position, the adducted grasps exhibited higher mean grip and axial forces. Grip forces were generally similar across the different grasps and Kinetic differences resulting from thumb position seemed to have no bearing on speed and legibility. Among the CHES 1, 20 % of the children had dysgraphic writing which increased to 32% in after 10 minutes task. Interventions for handwriting difficulties should focus more on speed and letter formation than on grasp pattern²²¹.

The effectiveness of Purposive Drawing Program (PDP) towards the treatment of dysgraphia disorder was conducted in a sample of 493 female students (grade one) selected from primary schools with dysgraphia disorder and 89 students from the selected sample had severe dysgraphia disorder in the pre-test. A purposive sample comprised of 40 subjects that were randomly divided into experimental and control groups with 20 subjects in each group. The samples were assessed on Wechsler Intelligence Scale for Children (WISC-R), Attention Deficit Hyperactivity Disorder (ADHD), Conduct Disorder test (CD) and a research made spelling tests. Results of t-test analysis showed that PDP was effective and there was a significant change in the dysgraphia disorder for the experimental group than the control group. It was concluded that Purposive Drawing Programme was an effective treatment as it reduces disorders of writing and spell Deficits in children²²².

Development of beginning writing skills in kindergarten children and the contribution of spelling and handwriting to these writing skills after accounting for early language, literacy, cognitive skills, and student characteristics were studied by Puranik and Alotaiba. Selected 242 children were given a battery of cognitive, oral language, reading, and writing measures. They exhibited a range of competency in spelling, handwriting, written expression, and in their ability to express ideas. Handwriting and spelling made statistically significant contributions to written expression, demonstrating the importance of these lower-order transcription skills to higher order text-generation skills from a very early age. The contributions of oral language and reading skills were not significant. Implications of these findings for writing development and instruction were addressed²²³.

Katusic reported epidemiology of written language disorder (WLD) in the population-based birth cohort (1976-1983) sample of 5718 children in Rochester, Minnesota. All the children were administered on IQ and achievement tests, extensive medical, educational test and socioeconomic was also collected. Diagnostic and Statistical Manual of Mental Disorders-IV-TR was used for the operational definition of WLD. The incidence of WLD varied from 6.9 percent to 14.7 percent (depending on the formula) and boys were 2-3 times more likely to be affected than girls. Among all the cases of WLD (n=806) 25 percent had WLD without reading disability and 87 percent had a writing problem. The study concluded that WLD was at least as frequent as reading disability and more frequent among boys and girls²²⁴.

Lane and Lewandowski (1994) compared the oral and written composition of seventh-and-eighth-grade students with and without learning disabilities on two story production tasks (dictation & handwriting). Fluency, time, rate and thematic maturity were dependent measures. Subtests of the TOWL-2 were used to assess the above. Results indicated that hand-written compositions of students with learning disabilities were technically inferior to normal achievers compositions. Whereas the groups composed similarly on the oral task, thematic maturity scores on the written task increased for normal achievers and with a decrease in learning disabilities students. There was a difference in the reading ability percentage scores in thematic maturity on the hand written task (26%) than the oral task (9%). The study concluded that learning disabled students displayed weaknesses in linguistics. Technical requirements of writing and as oral composition may offer advantages to this students²²⁵.

The knowledge of writing, composing process, attitude toward writing, and self-efficacy of students with and without Learning disabilities was studied among 7th & 8th grade (N=29; 21 males and 8 females) and 4th and 5th grade (n=10; 7 males and 3 females) students with learning disabilities and eighteen from 7th & 8th grade (14 males and 4 females) and eleven from 4th & 5th grade (7 males and 4 females) normally achieving students. Results showed that students with learning disabilities were found to have less mature conceptualizations of writing than normally achieving students. It was also found that students with learning disabilities were positive about writing and viewed it less favourable than their regular classmates. Finally, there were no differences between the two groups of students in their evaluations of their competence in either writing or carrying out the processes underlying effective composing²²⁶.

It was found that the pupils who learn by a global-natural method make errors that relate more to reproductive aspects of information and in contrast, the pupils who learned by the phonic and syllabic methods made more errors of meaning investigated writing disorders among children who have been taught by different methods of reading and writing. Different methods used emphasized on the processes of decoding bottom-up, others stressed top-down processes and emphasizing on meaning. In this longitudinal study, a sample of 260 school children of both sexes was selected from public and private schools and from different socioeconomic backgrounds²²⁷.

Specific Learning Disorder with impairment in Mathematics - Dyscalculia

Mathematic Disorder is another domain of SLD in which children experience difficulty in mathematical concepts.

A sample of 1,424 third-grade students (aged 9-10) of all primary schools in the City of Kragujevac, Serbia. Tests in mathematics were administered and only 1,078 students (538 boys and 540 girls) completed all five tests and dyscalculia was observed among 9.9 percent of the children. The difference between boys and girls on the tests scores, school achievement and the influence of place of residence/school were significant and independent predictive variables associated with dyscalculia were mathematic marks and Serbian language¹⁶⁶.

Amy, et al. (2013) studied the gender difference in children with Developmental Dyscalculia (DD) that depends on the diagnostic criteria. A sample of 1004 British primary school children completed mathematics and reading assessments. The prevalence of DD was 6.6 percent and was same for both genders regardless of the cut-off criteria applied. Mathematics scores were positively correlated with reading scores and remained the same with gender ($r=0.632$, $p<0.001$). The distribution of mathematics and reading scores were different among boys and girls. The distribution of reading scores differed significantly, but the distribution of mathematics scores differed marginally among the gender. Correlations between mathematics performance and the control measures selected to identify a specific learning difficulty affect both prevalence estimates and whether a gender difference is in fact identified. It was suggested that both genders should be given equal attention in assessing dyscalculia with special attention to children with average and above average reading performance¹⁷⁰.

The differences in the prevalence estimated for learning disorders depending on the definition criterion in a large sample of 1970 German students was studied by Wyschkon and his team. Results showed the prevalence of mathematics disorder ranged between 0.1% and 8.1% in the sample. Using the same definition criterion for both learning disorders, there are two to three times as many students with reading/spelling disorder than those with mathematics disorder. Whenever children with reading/spelling disorder are compared to children with mathematics disorder, the same definition criterion can be applied²²⁸.

The genetic and environmental etiologies of 3 aspects of low mathematical performance (math disability) and the full range of variability (math ability) which were compared with boys and girls in a sample of 5,348 children ages 10 years (members of 2,674 pairs of same-sex and opposite-sex twins) from the United Kingdom (UK). Web-based testing included problems from 3 domains of mathematics taught as part of the UK National Curriculum. Using quantitative genetic model-fitting analyses, similar results were found for math disabilities and abilities for all 3 measures and observed moderate genetic influence and environmental influence were mainly due to non-shared environmental factors that were unique to the individual, with little influence from the shared environment. No sex differences were found in the etiologies of math abilities and disabilities. The study concluded that low mathematical performance is the quantitative extreme of the same genetic and environmental factors responsible for variation throughout the distribution²²⁹.

Assessment tools are necessary to assess and identify children with learning disorder and this study has taken the initiative to validate and standardize an instrument to diagnosis developmental dyscalculia (mathematics disorder) in the Greek population and obtain relevant epidemiological data. Neuropsychological Test Battery for Number Processing and Calculation in Children (NUCALC) were administered on a community sample of 240 students' ages 7 to 11 years from urban and rural schools. Results showed no difference between genders in arithmetical performance; however, the effects of grade and socioeconomic level were significant. Prevalence was higher in the rural than in the urban area. A cross-cultural comparison of the Greek data with those obtained with the same instrument in other countries in schoolchildren of the same age was performed¹⁶⁵.

The demographic features and prevalence of Developmental Dyscalculia (DD) among 143 children aged 11 years from a cohort of 3029 students were evaluated for gender, IQ, linguistic and perceptual skills, symptoms of attention-deficit hyperactivity disorder (ADHD), socio-economic status and associated learning disabilities. One hundred forty children (75 girls and 65 boys) were retained in the study group, whose IQ ranged 80 to 129 (three were excluded because of low IQ level) of which 26 percent of the children had symptoms of ADHD, and 17 percent had dyslexia. Their socio-economic status was significantly lower than that of the rest of the cohort, and 42 percent had first-degree relatives with learning disabilities. The prevalence of dyscalculia in the original cohort was 6.5 percent, similar to that of dyslexia and ADHD. Unlike any other learning disabilities, dyscalculia affected both male and female in about the same proportions²³⁰. A small group of children with SAD (1.3%) were distinguished from larger groups with ARD (2.3%) and SRD (3.9%). Contrary

to some previous reports, there were equal numbers of males and females within each of the two groups with arithmetic difficulties but a predominance of males over females amongst the group with specific reading difficulties¹⁵⁸.

2.1c. Awareness of SLD among parents

Academic achievement is influenced by several factors besides intelligence and the most important are parental support to the child in academics. In fact, researches show that parental support is a powerful correlate of academic achievement than socioeconomic status and intelligence. A child receives both positive and negative impact on the family environment like reward, appreciation, encouragement, love and affection, on the other hand, its punishment, discouragement and disappointment. Children receive the above based on two aspects academic performance and behaviour. If the child scores well and shows good behaviour are rewarded and accepted or vice-versa irrespective of where they study school or university level. Academic performance is the major area of concern among parents and they need to be aware of various academic problems such as reading, writing, spelling and mathematics that may require attention and help to children with SLD.

The relationship between parent and child home literacy activity and children's academic functions is important for this a sample of 65 elementary-age children with reading disabilities along and their primary care givers were investigated. Three combinations of readings course were used to provide an index of reading achievement viz., Woodcock Reading Mastery Test-Revised (WRMT-R), Wide Range Achievement Test-3 (WRAT-3) and Word Identification, Word Attack. Results revealed small but significant correlations between race and IQ, mother's

education and literacy scores and child age and several of academic and literacy variables. Child literacy examination questions result revealed that the literacy experiences in the home varied greatly within the sample. Approximately 22 percent of the children were reading 7 to 9 times per week and more than half of the sample never visited the library while 20 percent of the children never read or looked at books alone at home and rarely watched educational programmes on Television. The results also indicated that children's home literacy activities were not significantly related to any of their academic abilities, whereas parents home literacy activities were significantly related to children's passage comprehension and spellings course²³¹.

Dyson (1996) examined parental stress, family functioning and sibling and self-concept in families with children with learning disabilities. Qualitative and quantitative measures of 19 parents and 19 siblings of school age children with learning disabilities. Among the children with learning disabilities 16 were males and 3 were females (ages 8 to 15) were assessed on Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974), Social Competence Scale of the Child Behaviour Check List (Achenbach, 1981), Resources and Stress-Short Form (Friedrich and Greenberg and Crnick, 1983), Resources and Stress (Holroyd, 1974). Findings revealed that functioning of the families and the self-concept of the siblings were comparable to that in families of non-disabled children but the parents in the former group experienced greater stress than did the parents of non-disabled children. Despite few problems in sibling relationships, the families experienced adaptation difficulties, especially with regard to the school. They also reported that although families experience emotional strain and isolation related to having a child with learning disabilities they also have positive family experiences¹⁷⁸.

2.1d. Awareness of SLD among teachers

The school is a second home to children as they spend most of their time learning and interacting with peers and teachers. Teachers are considered as the best role model as they mould the whole personality of the child. In our society teachers are respected and considered to be well knowledgeable. Teachers come across students with various issues as children often share their feelings and problems with them. It is the duty of the teacher to understand and be aware of the symptoms, characteristics, causes of the various educational problem faced by students with Specific learning disorder. Attempts have been to present studies related to awareness on SLD among teachers.

The level of knowledge of learning disabilities among first year in-service trainee teachers studying a distance learning Bachelor of Education program sponsored by the Malaysian Ministry of Education and final year pre-service trainee teachers enrolled in a regular bachelor of education program was investigated by Saad and the sample consisted of 296 students of bachelor degrees from two public universities (39 males and 257 females) with 147 in-service and 149 pre-service student teachers. After completing a 36-item questionnaire designed by the researchers, which had adequate psychometric properties. Results revealed that overall 70 percent of the student teacher's had awareness on types of disabilities, with 84.4 percent having knowledge on cognitive and 68.5 percent on dyslexia. Though media was the main source of information on types of disabilities, with 44.3 percent teacher obtained information on cognitive and 43.9 percent on dyslexia, a friend was also the source of information on cognitive and dyslexia with 38.2 percent and 25.3 percent respectively. A meagre 11.1 percent and 9.1 percent was through short and special courses and neighbours. In-service student teachers were found to be more

knowledgeable than pre-service student teachers. Student teachers' level of knowledge was not related to their age and teaching experience. However, their level of knowledge was somehow related to their status. Mass media were the main sources of information for both groups of trainee teachers. The implications of these findings for inclusive education and for future research in Malaysia were discussed²³².

Kafonogo and Bali (2013) studied the presence of pupils with learning disabilities in regular primary schools in Tanzania and whether or not the classroom teachers were aware of their presence. Data were collected using questionnaires, classroom observation guide, interview schedules, and documentary review checklist and guided by the Activity theory. A sample of 200 participants, 100 pupils (from 10,000 eligible children) and 100 teachers (from 1304 teachers) in public schools were selected. The collected data were analyzed using descriptive statistics and the results highlighted that 15 percent of pupils in regular schools have learning disabilities and teachers could not identify a child with LD accurately and effectively. They recommend schools to have proper screening and placement methods for children with learning disability²³³.

A survey was developed and data was collected randomly from 700 participants of primary language teachers across Kuwait's six educational districts. It was found that majority of teachers lack the training, knowledge, and skills to diagnose the dyslexic students in their classroom. They concluded an urgent need for practitioners, course designers, and ministry of education policymakers, where dyslexia and other learning disabilities are pressing & urgent issues for students, teachers, and specialist support staff²³⁴.

Gwernan-Jones and Burden (2010) studied the knowledge about Student teachers' attitudes about dyslexia in Devon. The Student teachers expressed strongly positive attitudes toward identification of dyslexic, with the majority expressing confidence in their ability to support dyslexic pupils. Female student-teachers had significantly more positive attitudes toward dyslexia than male counterparts. The study revealed that teachers who took the survey before and after teaching practice demonstrated small but significant changes in attitude scores over that time. It is proposed that a new breed of teachers may be entering the teaching profession with positive beliefs about their ability to help dyslexic pupils²³⁵.

Antoniazzi and Snow (2010) studied teachers who are able to identify children at risk for language impairment during the first year of school. Fifteen teachers completed Children Communication Checklist of 149 students in their first year of school and ratings were compared with results of screening using Clinical Examination of Language Fundamentals Screening Test. It was found that teacher ratings showed poor sensitivity and specificity in identifying children whose oral language skills require further investigation²³⁶. In another study attitude of 30 teachers were determined using both an implicit measure and an explicit, self-report measure and 307 students achievement scores were also obtained. Implicit teacher attitudes toward dyslexia related to teacher ratings of student achievement on a writing task and also to student achievement on standardized tests of spelling. Self-reported attitudes of the teachers toward dyslexia did not relate to any of the outcome measures. Neither the implicit nor the explicit measures of teacher attitudes related to teacher expectations. The results show implicit attitude measures to be a more valuable predictor of the achievement of students with dyslexia than explicit, self-report attitude measures²³⁷.

The study showed that most of the participants in this study did not have adequate knowledge of classroom acoustics and also some participants were unaware of the impact that classrooms with poor acoustic environments can have on speech perception and learning²³⁸. While the response rate was 37 percent with 100 teachers did not return the survey and without knowing what percentage of teachers did and did not teach children with LD. Results showed that there is a significant relationship in the teachers perception with a number of LD children in the classroom and their interaction with the special educator, there was also no significant relationships were found between perceptions and teachers experience, qualification, courses and workshop attended that addressed children with LD. Hence, it is concluded though there was a negative perception among Algebra 1 teachers, but most agreed that inclusive classroom education and giving adequate training to teachers on how to meet state curriculum goals²³⁹. Many teachers have positive attitudes to both code-based and meaning-based reading instruction, although attitudes are, surprisingly, somewhat more positive toward code-based instruction. The result suggested a swing towards a more balanced approach to reading instruction, which has suffered in recent years from a strong movement away from a skills-based approach²¹⁶.

A study was conducted to assess the attitude and knowledge of attention deficit hyperactivity disorder and learning disability among high school teachers. Forty-six high school teachers were selected and were divided into two groups 25 teachers taught at an academic school (School 1), and 21 teachers taught at special education school (School 2) and dealt with Attention Deficit Hyperkinetic Disorder/Learning Disability cases regularly. Results revealed that general knowledge about Attention Deficit Hyperkinetic Disorder (71%) and about Learning Disability (74%) was

relatively low among both groups. Thirteen percent of all teachers considered Learning Disability to be the result of parental attitudes, namely ‘spoiling’ the children. In relation to Learning Disability cases, the overall scoring for positive attitude was 75%. However, this score was higher for Group B teachers²⁴⁰. In this longitudinal study, 603 children from grade 2 were rated by the teachers and the ratings were correlated with results of spellings, reading and intelligence in grade three. The 3rd grade testing for reading, spelling and intelligence classified children into groups with low achievement and dyslexia and these two groups were compared with normally achieving children. The result showed that teachers were quite accurate in their judgment of low achievement, but less efficient in their judgment of specific reading difficulties²⁴¹.

A descriptive survey in Nigeria was conducted to assess the awareness of school teachers regarding learning disabilities and identify their coping strategies. The sample of 100 primary school teachers from both private and government schools was administered on structured knowledge questionnaire. Results revealed that 43.6 percent of the teachers had good knowledge of learning difficulties and 18.1 percent had excellent knowledge of what constitutes learning difficulties. However, a considerable sample of 38.3 percent had just fair knowledge while 4.3 percent had poor knowledge. The study concluded that considerable proportion of the teachers still had an unacceptable level of knowledge (fair and poor) on what learning difficulties exactly means²⁴².

2.2. INDIAN STUDIES

2.2a. Prevalence of Specific Learning Disorder

In India, there is no exact percentage on prevalence SLD among school children, even though they are included in the list of various disabilities categories in India. It is estimated that the prevalence of Learning Disability is expected to be 1 in 59 among the estimated population in India^{111,112}.

A cross-sectional study comprised of a three-staged screening procedure for assessing learning disabilities among 3600 students from 3rd and 4th grade studying in government schools. The first stage comprised of the teacher identifying the at-risk student. In the second stage, teachers assessed at-risk students using Specific Learning Disability-Screening Questionnaire (SLD-SQ). The third stage comprised of an assessment of the screen positive students using Brigance Diagnostic Inventory (BDI) part of NIMHANS Index of Specific Learning Disabilities for identifying the cases of SLD. It was found that 33.6 percent children were identified as at-risk by the teachers at the first stage of which, 360 children were found positive in the second stage using SLD-SQ. The most common deficits were-missing out words or sentences while reading, misplacing letters or words while reading or writing, and making the frequent mistake in spelling while writing or reading. Later, 108 children were confirmed to have a learning disability on the third stage using BDI, which represented 3.08 percent of the sample²⁴³.

The academic performance of those with SLD (between 5 to 10 years) among 329 students from the primary section in regular school was studied by Martina, Kumari and Bhuvanewari. Using purposive sample method, 90 students who showed

difficulties in learning and academic performance were selected and assessed based on their learning difficulty and marks obtained in examinations. It was found that 43 percent of the children had a reading disorder (dyslexia), 17 percent had a problem in written expression disorder and 40% had a mathematic disorder when compared with their academic marks¹⁵⁴. Another study on the prevalence of Learning Disabilities (LD) among 1156 students (668 boys and 488 girls) aged 6 to 13 years and reported 12.8% prevalence of LD (148 positive cases), dyscalculia was least to 15.54% followed by dyslexia to 21.62% then dysgraphia to 22.30% and with highest percentage of mixed disorder which was 40.50% among students selected from primary schools in rural area of Jaipur following English and Hindi mode of instructions¹³⁵. The results of another cross-sectional study conducted in south India showed 15.17 percent prevalence of specific learning disabilities in children with 12.5 percent, 11.2 percent and 10.5 percent in specific domains like dysgraphia, dyslexia and dyscalculia, respectively. The study concluded dysgraphia as the common problem in specific learning disabilities¹³⁴. In the following study, Priti reported 1.58 percent of prevalence of Learning Disorder among the 2402 students selected from class VII to XII from different schools in Chandigarh²⁴⁴. The study concluded dysgraphia as the common problem in specific learning disabilities¹³⁴. The prevalence of learning difficulties / disability in Dharwad city, Karnataka during 2005 – 2006 and found the prevalence of learning difficulties to be 17 percent and disability to four percent among primary school children¹³².

One study reported no difference in the prevalence of SLD among the gender¹³⁵, while more boys were diagnosed with specific learning disorder²⁴⁴ and same was revealed in this study where boys were 2-4 times more with learning disability than

girls¹³². The prevalence of learning disability was 31.2 percent, with more male (34.77%) when compared to female (27.6%) among a sample of 840 adolescents students selected through multistage random sampling technique from the district of Dehradun²⁴⁵. Children with SDL can be provided with special equipment and facilities to perform better in academics¹⁵⁵. The disorder is not identified until later age and screening to should be used by teachers to suspect students for SLD²⁴⁴.

Shah and Bajaj (1994) detected children having uneven performance in different subjects in school using a statistical method and found that out of 186 students from an English medium school, 34% of the students had poor performance at least in one subject when compared to their performance in other subjects. The poor performance was mainly either in languages (Marathi, Hindi) (43/186) or arithmetic (14/186). They suggested that this statistical method may be used as a screening tool to detect children who may be having Specific Learning Disability¹²⁷.

Choudhary, Jain, Chahar, and Singal (2012) assessed the prevalence of learning disorders in school going children and compared their socio-demographic variables and other related factors with a learning disorder. Five students of class III to V from all sections were given the dyslexia assessment questionnaire (DAQ) to fill; 468 students returned the completed forms. Only 68 children scored ≥ 4 on DAQ and were given MISIC (Mallin's intelligence scale for Indian children) for IQ assessment and DST-J for dyslexia screening. Forty-eight students were labelled as dyslexia and the further diagnosis was confirmed by DSM-IV-TR classification. Results showed that prevalence of learning disorders (LD) was found to be 10.25 percent with higher in males than females (11.40% vs. 7.14%), while delivery complications (20.83% vs.

4.17%) were more in LD and more family members were left handed (16.67% vs. 2.08%) as compared to control group. In classroom behaviour, children with LD asked questions less (10.42% vs. 75%), answered questions less frequently (6.25% vs. 79.16%) and took notes less attentively than the control group (4.17% vs. 58.33%). The study, therefore, attempted to identify children with learning disorders and explore the prevalence of the problem and etiological factors e.g., family environment, social factors and developmental issues of child and associated co-morbidities and suggested more studies with larger sample size should be undertaken to get an accurate picture of these disorders. They also mentioned the need for some community-based programme to raise the level of awareness and knowledge about these disorders in general population²⁴⁶.

A prospective observational study was conducted on Clinical and psycho educational profile of children with specific learning disability (SpLD) and co-occurring attention-deficit hyperactivity disorder at Lokmanya Tilak Municipal Medical College and General Hospital, Mumbai with the aim to document the clinical profile and academic history of children with specific learning disabilities and co-occurring Attention Deficit Hyperkinetic Disorder. The study results showed the mean age of children was 11.4 years and 30 percent children had a significant perinatal history, 24 percent had delayed walking, 22 percent had delayed talking, 10 percent had microcephaly, 54 percent displayed soft neurological signs and 20 percent had primary nocturnal enuresis. Their academic problems were difficulties in writing (96%), inattentiveness (96%), difficulties in mathematics (74%), hyperactivity (68%) and difficulties in reading (60%). The researcher concluded that Children with specific learning disabilities and co-occurring Attention Deficit Hyperkinetic Disorder need to be

identified at an early age to prevent poor school performance and behavioural problems¹⁷². An epidemiology study of child & adolescent psychiatric disorders in urban and rural areas of Bangalore and found the prevalence rate of the scholastic problem was 9.4 percent when compared to overall of 12 percent of other psychiatric disorders²⁴⁷.

Karande, Sawant, Kulkarni, Galvankar, et al. (2005) conducted a cross-sectional study on the cognitive abilities of children with specific learning disability (SLD) with average to superior intelligence. A sample of 95 children aged 9-14 years were individually assessed on 13 cognitive functions battery (CFTs) devised by the Janna Prabodhini's Institute of Psychology, Pune and Guilford's Structure of Intellect Model (figural, symbolic, semantic and behavioural). Results revealed no significant difference between CFTs scores and four area of information. The study concluded that the cognitive abilities are similar in children with SLD¹⁵¹.

2.2b. Awareness of SLD among parents

The parental attitude towards children with specific learning disabilities was conducted among parents of 60 Out-Patient children with equal boys and girls identified with Specific Learning Disability (SLD) from Child and Adolescent Psychiatry department, NIMHANS, Bangalore, India. The attitudes of parents on the Parental Attitude Scale showed significant differences related to the gender of the children in various domains of the scale. The study was concluded with a need to educate parents to lower their academic expectations for children with specific learning disabilities and strengthen the social support network of these children's families²⁴⁸. In another study the quality of life (QOL) among parents of children

identified with specific learning disability (SLD) and its impact on clinical and socio-demographic characteristics. One hundred and fifty parents of children who have been consecutively diagnosed with SLD were enrolled from Tertiary Care Hospital and QOL questionnaire was administered. The QOL facts and domains contributed significantly to their "overall" QOL and mothers currently ill, low paid job with male child predicted poor QOL scores. The counsellor should focus on all facts and domains to improve the overall QOL among parents which would improve home environment and also rehabilitate children with SLD²⁴⁹. While interventional programme seems to be effective in improving the knowledge on specific learning disorder among parents which was conducted among 50 parents selected from Mumbai schools²⁵⁰. Devi and Kiran, study elicited that large family size, low education status of parents, lack of parental involvement and encouragement were the major family factors associated with scholastic backwardness among 100 students (50 boys & 50 girls) of classes 9th and 10th selected from a private school in Hyderabad²⁵¹. Parental encourage had a significant difference between the mean scores of boy and girl of low achieving groups indicating that girls receiving much more parental encouragement than the boys¹²⁶.

2.2c. Awareness of SLD among teachers

Teachers acknowledge that there is a need for a training session to further development of children with LD and also improve their knowledge^{252,253}. This is a cross-sectional was carried out in public schools located in the urban (N= 11), rural (N=7) and slum areas (2) of Chandigarh. Twenty schools were selected from 103 schools through randomly by proportionate sampling method. Eighty teachers of 3rd and 4th grades of these schools were selected using purposive sampling. Teachers

were briefed about the symptoms of LD and filled in a structured questionnaire about their socio-demographic status, methods of teaching, and students' progress and their perception about LD. The demographic information showed that 87.5 percent were females, 57.5 percent had more than 5 years teaching experience, 68 percent were able to give attention, while 48 percent felt they are not able to give attention due to lack of time and 62.5 percent do discuss LD children with their higher authorities at school. Results showed that 56.3 percent of teachers were aware of LD, 67.5 percent of teachers encounter children with LD, 62.5 percent felt the need for separate class rooms and were willing to undergo special training and 43.8 percent approved educating LD children in special schools, while 36.3 percent endorsed integration to regular schools. The majority of the teachers felt there were aware of LD but still 2/5 of the teachers were not aware of LD²⁵².

The level and awareness of LD among 60 primary school teachers selected from 15 schools through lottery method in the region of Haridwar. It was found that 67 percent of the teachers had no knowledge, 20 percent had average and only 11 percent had a satisfactory level of knowledge and awareness about learning disabilities. Among the sample 32 percent had knowledge on concept, 35 percent on types of SLD, 29 percent of causes, 11 percent on identification, 88 percent able to differentiate between learning disability and mental retardation and 25 percent were able to give remedial²⁵³.

Moothedath and Vranda explored the knowledge of primary school teachers in identifying children with learning disabilities among 200 primary school teachers were selected from 16 schools in Bangalore, India. Their knowledge was assessed

using Knowledge Questionnaire on Learning Disabilities on various domains. Results showed that majority (67.5%) of the teachers had adequate knowledge about the concept and definition, but there was inadequate knowledge about incidence and prevalence among 92%, and about causes and classification among 50.5%. Only 16% of them had adequate knowledge about clinical manifestation of learning disabilities. The majority of the respondents (59.5%) had moderately adequate knowledge about identification and treatment, and about treatment-related aspects (47%). Also, the majority (46.5%) had adequate knowledge about the outcome. The study revealed that only 5% of the primary school teachers had adequate knowledge about learning disabilities. They concluded that there is a need to improve the knowledge of primary school teachers for the identification of children with learning disabilities and based on their finding they developed “Manual for Primary School Teachers on Learning Disabilities”²⁵⁴. An observational study carried out among 34 primary school teachers from 2 different schools in Puducherry, Results showed that 29 percent of the school teachers had knowledge of learning disability, 44 percent prior exposure to SLD and 9 percent had friend or family member with SLD, while experience had no significant difference between SLD awareness. This new screening questionnaire validation was successful for Indian setting and need to be used in other settings to extrapolate our findings¹⁸⁷. In another study teacher educators serving in the colleges of education were selected on the basis of the stratified random sampling technique. The sample consists of 94 teacher educators (50 male and 44 female), having teaching experiences ranging from one year to ten years in the college of education. A close ended questionnaire with 35 items, with 10 items each dyslexia, dyscalculia, dysgraphia and 5 items on behavioural aspects. Results showed that educators on Knowledge of SpLD (N=94) was found as 10.39 and 3.24 respectively. The mean score of the entire

group falls within the range of 9 to 14. It indicates that the entire group has an average level of knowledge about the Specific Learning Disability. There was no statistical difference found in the awareness of SpLD among the gender and teaching experience of the educators. The study found that the teachers in the inclusive classroom require skill training to impart education to the SpLD. The data shows that the knowledge about the SpLD in an inclusive education set-up is average and recommends the Government of India to implement intensive and rigorous training to fulfil the educational needs of the Special Needs Children¹⁸⁶.

Saravanabhavan and Saravanabhavan assessed the level of knowledge about learning disabilities (LD) among teachers in India. A survey form was distributed among 144 teachers' from two regular high schools, 38 teachers were from two special schools, and 165 pre-service teachers from teacher's education college in a metropolitan city in the southern state in India. One-way analysis of variance showed a significant difference in the knowledge level of learning disabilities among teachers working in regular, special and pre-service. Among the three groups, the pre-service teacher group scored the lowest ($M = 60.76$, $SD = 13.36$, $N = 165$) which was below the mean score for the entire group ($M = 66.32$, $SD = 13.37$, $N = 347$). Teaching experience and familiarity with persons with LD did not affect the knowledge level of the three groups of participants. Hence, it was recommended to improve the knowledge level of learning disabilities among pre-service teachers and among physicians, parents, paraprofessionals, educational administrators and other stake holders¹⁸¹.

Gandhimathi and Eljo (2009) studied the awareness about learning disabilities among primary school teachers selected from 80 schools in Tiruverumbur block, Tiruchirappalli (Government and private schools). Through lottery method, 16 schools were selected and data from 71 teachers was collected. Results showed that 66.2 percent of the respondents had a low level of awareness about learning disability. Social workers can be used to intervene with the teachers to enhance their level of awareness regarding learning disabilities among school children¹⁸⁹.

Dharmaraj (2000) focused on developing a rating scale to assess the awareness of primary school teachers on various aspects of learning disabilities in mathematics and its awareness. Results showed that teachers with higher educational qualification (post-graduates) had better awareness than graduate or secondary grade teachers¹⁹⁰. The awareness level of primary school teachers towards learning disabilities in English exhibited a low level of awareness and the study concluded the need for awareness of LD among primary school teachers in English. Other factors such as teaching experience, type of school, locality of the school had an influence on the awareness level among the teachers¹⁸⁸.

Harinath (2000) studied the awareness of teachers on learning difficulties/ disabilities of children in English. The sample consists of 32 teachers teaching English subjects were administered on Awareness Scale. The scale consists of 46 items related to learning difficulties concepts, causes, characteristics, and instructional strategies were administered. Teachers exhibited high awareness on item 17 which was under instructional strategies, moderate and low awareness on item 16 and 13 respectively. The researchers also developed a diagnostic test tool, assess intelligence and

personality of students with reading, writing and spelling difficulties in English and also study the awareness of LD among parents and teachers. The study revealed that boys experienced more reading disabilities than girls with no effects on age and class. Community, location and medium of instruction had an influence on their spelling while parental education qualification and income influenced LD. The study concluded explaining various factors related to LD²⁵⁵.

The above reviews indicate that limited studies have been researched in India when compared to International literature. There were no individual studies found in the literature related to the domains of SLD (Dyslexia, Dysgraphia, and Dyscalculia). Studies on prevalence of learning disabilities were restricted to smaller sample size, rural population, class / age group and associated with other psychiatric disorders. Limited studies have been found on awareness, attitude, acceptance and identification of LD among teachers and parents. The current study will give information on parents and teachers awareness on SLD. It is important to have knowledge and information related the problems / difficulties that are among school children as early identification and intervention. It is also important that educational course related to SLD and appropriate training programme for parents and teachers to enhance their knowledge on issued related to SLD and other developmental issues.

METHODOLOGY

The investigator carried out the present study to find the prevalence of Specific Learning Disorder (SLD) among school children and its awareness among parents and teachers through systematic adaptation of the following methodology.

3.1. AIM

To study the prevalence of Learning Difficulty (LD) in school children and awareness of learning difficulty among parents and teachers

3.2. STATEMENT OF THE PROBLEMS

1. Does the prevalence of specific learning disorder vary among urban and rural children studying in Central Board of Secondary Education (CBSE) and State Board (SB) schools?
2. Whether the demographic data of the child have any impact on the prevalence of specific learning disorder.
3. Do parents and teachers have awareness on specific learning disorder and will their demographic data have any influence on their awareness?

3.3. OBJECTIVES

Keeping in view the need for the study, the following objectives were formulated:

- A) To study the prevalence of Specific Learning Disorder (SLD) between rural (Thiruvallur) and urban (Chennai) school children.

- B) To study the problems of Specific Learning Disorder (SLD) with respect to English, Tamil (Regional language) and Mathematics between rural and urban school children.
- C) To study the association of class, gender and type of school with Specific Learning Disorder (SLD) among school children.
- D) To study the awareness about Specific Learning Disorder (SLD) among parents of children studying in school.
- E) To find out the level of Specific Learning Disorder (SLD) awareness among parents in association with their age, education, occupation and income.
- F) To study the awareness about Specific Learning Disorder (SLD) among school teachers.
- G) To study the level of Specific Learning Disorder (SLD) awareness among the teachers in association with their professional aspects such as gender, education, work experience and type of schools.

3.4. HYPOTHESES OF THE STUDY

To fulfil the above aims and objectives of the study the following hypotheses were formulated. Previous studies of literature have also guided in formulating these hypotheses.

Major Hypothesis 1

There will be a significant difference in the prevalence of Specific Learning Disorder (SLD) between rural (Thiruvallur) and urban (Chennai) school children.

Minor Hypotheses

- A) There will be a significant difference in the prevalence of specific learning disorder between Central Board of Secondary Education (CBSE) and State Board (SB) school children.
- B) There will be a significant difference in the prevalence of specific learning disorder between boys and girls.
- C) There will be a significant difference in the prevalence of specific learning disorder among children studying in different classes.
- D) There will be a significant difference in prevalence of specific learning disorder in different subjects such as English, Tamil (Regional Language), Mathematics among
 - i. Urban and rural school children
 - ii. CBSE and SB school children
- E) There will be a significant association between demographic variables of school children with regard to specific learning disorder.

Major Hypothesis 2

There will be a significant difference in overall awareness about Specific Learning Disorder (SLD) between the parents of children studying in urban and rural schools.

Minor Hypotheses

- A) There will be a significant difference in the overall awareness about Specific Learning Disorder (SLD) between the parents of children studying in CBSE and SB schools.

B) There will be a significant association between awareness on Specific Learning Disorder (SLD) among fathers with regard to their

- i. age
- ii. education
- iii. occupation
- iv. income

C) There will be a significant association between awareness on Specific Learning Disorder (SLD) among mothers with regard to their

- i. age
- ii. education
- iii. occupation
- iv. income

Major Hypothesis 3

There will be a significant difference in the overall awareness of Specific Learning Disorder (SLD) between teachers from urban and rural schools.

Minor Hypotheses

A) There will be a significant difference in the overall awareness of Specific Learning Disorder (SLD) between teachers from CBSE and SB schools.

B) There will be a significant association between the level of awareness on Specific Learning Disorder (SLD) among the teachers in with regard to their

- i. age
- ii. gender
- iii. Type of school

- iv. Occupation
- v. Place of residence
- vi. Education Qualification
- vii. Work experience
- viii. Class handling
- ix. Subject teaching

3.5. OPERATIONAL DEFINITIONS

Prevalence

The term prevalence of specific learning disorder refers to the estimated population of people who are having learning disabilities at any given time.

Specific Learning Disorder

It refers to a heterogeneous group of conditions wherein there is a deficit in processing language, spoken or written, that may manifest itself as a difficulty to comprehend, speak, read, write, spell, or to do mathematical calculations.

Specific Learning Disorder with impairment in reading - Dyslexia

It is a learning disorder that impairs the ability to learn to read. This is a language based disability where a person has trouble understanding printed text.

Specific Learning Disorder with impairment in written expression - Dysgraphia

Deficits in writing, which may include lack of organization, clarity, unity, fragmentation of written concepts, mechanical errors, reversals, transpositions, and

omissions of letters or words. Spelling may be poor, handwriting may be illegible, and written ideas may be disorganized and incomprehensible.

Specific Learning Disorder with impairment in Mathematics - Dyscalculia

Individual (school children) who have impaired ability to learn grade appropriate Mathematics.

Awareness

Having awareness related to academic difficulty, facilities available for children with Specific Learning Disorder among parents and teachers.

Tamil (Regional Language)

Tamil is the regional language of Tamil Nadu, the southern state of India.

Parent

They are child's primary caregivers with whom the child has been living.

3.6. RESEARCH DESIGN

The design adopted for the present study is cross-sectional and descriptive in nature (Kerlinger, 2001) ²⁵⁶. The purpose of adopting this design is to study the prevalence of specific learning disorder (students) and its awareness (parents & teachers) at any single point in time from a specific population and also assess the relationship between the variables and differences between the subgroups in the sample. The sample group consists of students from class two to six studying in

Central Board of Secondary Education (CBSE) and State Board (SB) and their parents and teachers.

3.7. SAMPLING PROCEDURE

Selection of area and Schools

In Tamil Nadu, the literacy rate has increased from 73.45 percent to 80.30 percent since 2001 to 2011. Chennai is considered as a hub for offering an excellent education with the literacy rate of 90.33 percent (Census 2011)¹⁴¹. Using purposive sampling technique Chennai was selected for studying the urban sample and to study the rural sample the nearest Thiruvallur region was selected through lottery method.

The survey was carried out by gathering information related to getting the list of Central Board Secondary Education (CBSE) and State Board (SB) aided and unaided schools in urban (Chennai) and rural (Thiruvallur) region following English as a medium of instructions from the Directorate of School Education Department, Chennai¹⁹⁵. There are 1127 and 526 schools in urban (Chennai) and rural (Thiruvallur) region respectively (Both CBSE and SB). All the schools were arranged in alphabetical order and a number was given to each school from both CBSE and SB in urban (Chennai) and rural (Thiruvallur) separately. The numbers were written on a slip and were folded and mixed in a box. Through blindfold two schools from each type of schools (CBSE and SB) were selected from urban (Chennai) and the same procedure was adopted for selection of schools in rural (Thiruvallur) region. The concerned school administration (Principal) was contacted for permission to conduct the present study.

Table 6 - Name and the schools, types of schools (CBSE and SB) selected from urban (Chennai) and rural (Thiruvallur)

Sl. No	Name of the school	Type of the School	Region
1	Srimathi Mohini Sarogi Vivekananda Vidyalaya	CBSE	Urban (Chennai)
2	Asan Memorial Sr. Sec. School	CBSE	Urban (Chennai)
3	Velankanni, Hr. Sec. School	SB	Urban (Chennai)
4.	Alagappa Hr. Sec. School	SB	Urban (Chennai)
5	Sree Niketan Patasala	CBSE	Rural (Thiruvallur)
6	S.S. Citizen School	CBSE	Rural (Thiruvallur)
7	Sree Niketan Hr. Sec School	SB	Rural (Thiruvallur)
8	Kamaraj School	SB	Rural (Thiruvallur)

SAMPLE SIZE

It is estimated that approximately 13 to 14 percent of all school children were suffering from learning disabilities¹³³. The prevalence rate of learning disabilities was 15.17 percent¹³⁴ and 12.8 percent¹³⁵ among school children. As per DSM-V, (2013) the prevalence of SLD ranged from 5 to 15 percent among school children². Therefore, the sample size was calculated having 15% using the formula²⁵⁷.

$$N = g * Z^2 P (1-P)/d^2$$

where

Z = Level of confidence

P = the proportion of normal children

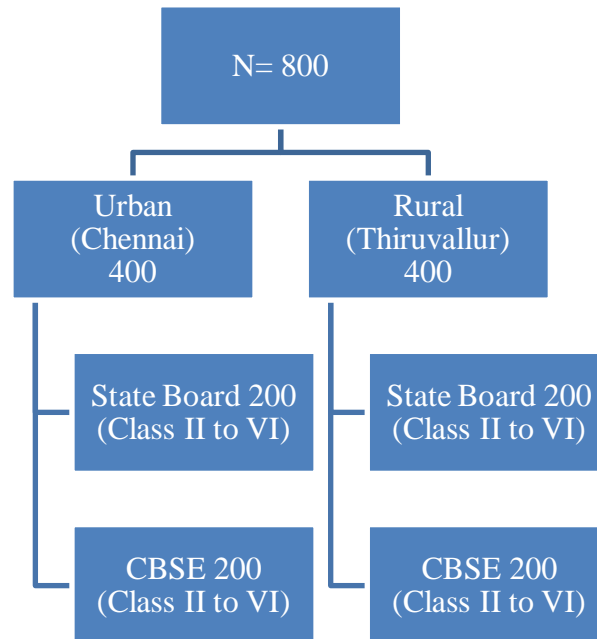
d = Relative precision g= Design effect

$$2 * 1.96^2(15(100-15)/3.75^2 = 696$$

The sample size was estimated with 25% relative precision and 95% of confidence to be 348. This was multiplied by two which was calculated to be 696 to allow for design effect due to the application of cluster sampling method (equal sex, urban-

rural, socio-economic ratio). For equal distribution of the sample in clusters, the ultimate sample size required for the study was determined as 800 children.

Graph 1 - Systematic representation of sample selection of children studying in SB and CBSE schools in Chennai and Thiruvallur



Selection of Students

After obtaining permission from the Principals of the schools, the researcher was introduced to the respective class teachers to select the students from their school attendance register through systematic random sampling method. There were a minimum of 2 sections and maximum of 6 sections for each class in the schools selected. To have a proportionate sample, students were selected from A and B section from each class from the selected schools. Students from class II to VI were selected with a sample of 20 from each class with an equal number of boys and girls making a total of 100 students from each school. After obtaining written consent from the parents, the selected children were assessed for Specific Learning Disorder (SLD).

A total of 200 students each from urban (Chennai) Central Board of Secondary Education (CBSE) and State Board (SB) schools and 200 students each from rural (Thiruvallur) Central Board of Secondary Education (CBSE) and State Board (SB) schools were assessed, making a total sample of 800 students.

Selection of Parents

As the study also focuses on the SLD awareness among parents, hence parents of the selected children too participated in the study (N=800 parents both father and mother)

Selection of Teachers

All the teachers in the selected Central Board of Secondary Education (CBSE) and State Board (SB) schools from urban (Chennai) and rural (Thiruvallur) region were given consent form for their willingness to participate in the study and only teachers who have given consent were included in the research. The number of teachers working in the urban CBSE and SB were more than in rural schools. A total number of teachers participated in the study from urban (Chennai) were N=200 (SB N=100 and CBSE N=100 teachers) and rural (Thiruvallur) were N=100 (SB N=50 and CBSE N=50 teachers).

3.8. TOOLS USED FOR THE STUDY

Paper - pencil method was used to assess Specific Learning Disorder (SLD) such as reading, writing, in English, Tamil (regional language) and Mathematics. The questionnaire method was adopted for parents and teachers to bring forth the awareness of SLD.

TOOLS USED AND ITS DESCRIPTION

- A) HELP CHILD Learning Difficulty (Dyslexia) Assessment Tool
- B) Specific Learning Disorder Awareness Questionnaire for parents and teachers - By R. Faiz Jahan Begum

A. Learning Difficulty (Dyslexia) Assessment Test (2005) is a pencil paper test designed by the HELP CHILD, Centre for children with learning difficulty, Chennai to measure the type and severity of Specific Learning Disorder in English, Tamil and Mathematics and its domains.

Procedure for assessment of SLD

English Assessment: It assessed the child's ability to write, say and read the English language. First the child was asked to say the English alphabet A to Z orally. Next the child was asked to write the alphabets – capital letters (A to Z) and small letters (a to z). It was followed by a dictation of 15 words and 10 sentences. Later the child was asked to read both capital and small letters randomly, followed by reading 15 words and 10 sentences. This assesses the letter identification, letter recognition, word recognition and pronunciation of the words.

English Assessment Scoring – A score of 1 will be assigned for ever error

Tamil Assessment: It assessed the child's ability to write, say and read the Tamil language. The child was asked to say the uyirezhuthugal-Vowels (அ-ஓ), meiyezhuthugal-Consonants (க-ள்), uyirmeiezhuthugal-Vowel-consonants (க-கௌ). Then the child was asked to write the uyirezhuthugal-Vowels (அ-ஓ), meiyezhuthugal-Consonants(க-ள்), uyirmeiezhuthugal-Vowel-consonants (க-கௌ)

followed by a list of 15 words and 10 sentences dictation. Later the child was asked to read uyirezhuthugal - Vowels (அ-ஓ), meiyezhuthugal - Consonants (க-ங்), uyirmeiezhuthugal - Vowel-consonants (க-டுகள) letters in randomly and followed by reading 15 words and 10 sentences.

Tamil Assessment Scoring - A score of 1 will be assigned for ever error.

Mathematics Assessment: The child was asked to write the number sequence both forward and backward, before and after numbers, symbol recognition, number names, numerals and place value. The child was asked to read numbers 1-20 for number identification and recognition. Next the child was asked to say numbers 1-20 both forward and backwards. Basic arithmetical operation skills like addition and subtraction were assessed.

Mathematics Assessment Scoring: A score of 1 will be assigned for ever error.

The maximum score is 500 and the minimum score is zero. Higher the error scores, severe the difficulty in the respective domains and subjects.

Table 7 - Percentage and level of specific learning disorder

Scores in percent	Level of Difficulty
below 25%	No SLD
26% to 50%	Mild SLD
51% to 75%	Moderate SLD
above 75%	Severe SLD

Highlights of the Specific Learning Disorder (SLD) assessment tool: It is a comprehensive scale that gives a quality assessment of SLD. It assesses reading, writing and oral in English, Tamil and Mathematics. It is applicable to both genders and has been locally standardized. It takes 90 to 120 minutes to complete the assessment. Assessment can be classified as class appropriate and can be done

irrespective of educational pattern – CBSE, State Board, Matriculation, and Anglo-Indian. The instructions for each heading are given in English and Tamil for the child to understand.

B) Specific Learning Disorder (SLD) Awareness Questionnaire for Parents and Teachers.

The Specific Learning Disorder (SLD) awareness questionnaire was constructed by the researcher to assess the SLD awareness among parents and teachers. The questionnaire consisted of 24 items with yes or no response. Initially, 45 statements were formulated with the help of experts' opinion and review of the literature. The response obtained from pilot study was utilized for elimination of some ambiguous questions and the final questionnaire consisted of 24 items in various domains. It assessed the knowledge, awareness and perception about SLD among parents and teachers. The questionnaire has four domains namely media, facilities, academic and perception

Procedure: Parents and Teachers are required to answer **YES or NO to the 24 items** in the questionnaire to assess their awareness of Specific Learning Disorder.

Scoring: A score of **1** is assign for the response **YES and 0** for **NO**. Reverse scoring is assigned for item number 7, 9, 15 and 19. The maximum score can be obtained is 24 and the minimum is 0. A lower score indicates inadequate and higher scores indicated a good awareness on SLD. Awareness score was categorized as inadequate, moderate and good with respective score range 0-12; 13 to 18 and 19 to 24.

Table 8 - Scores and interpretation of Specific Learning Disorder (SLD) awareness questionnaire

Interpretation	Scores	Percentage of SLD awareness
Inadequate awareness	0-12	< 50%
Moderate awareness	13 -18	51 -75%
Good awareness	19 -24	76 -100%

Duration: It takes 15 to 20 minutes to complete the questionnaire.

3. 9. CONDUCTION OF THE ASSESSMENT

The children were assessed for Specific Learning Disorder (SLD) in their respective schools. A distraction free, well-ventilated room was allotted with proper seating arrangement. The children were assessed on subjects of English, Tamil and Mathematical concepts and its domains. Child's pencil holding and behaviour were observed and noted in their respective assessment sheet. The selected children were divided into small groups of fives and the session lasted for 90 minutes to 120 minutes to complete the assessment. Children were let to go for drinking water and restroom whenever required. Children were given clear instructions in English as well as in regional language (Tamil) for better understanding. Each child was provided with writing material (pencil, eraser and sharpener) along with the assessment sheets. The study was carried out during the year 2013-14 and after commencing of the academic year the assessment was conducted. The researcher observed the behaviour exhibited by the children during and eventually logged the observation such as the child's being cooperative, distracted, restless, talking, nail biting and meddling with things.

3. 10. PILOT STUDY

The sample size comprised of 200 children from both CBSE and SB schools with an equal number of boys and girls from class II to VI and 200 parents (both father and mother) of the assessed students and hundred teachers too were selected for the pilot study. Suitable modifications were carried out with regard to time duration and instructions in order to limit stress on the students, parents and teachers while completing the required assessment and questionnaires.

3. 11. VALIDITY AND RELIABILITY OF THE TOOLS

After construction of the tools for assessing children with Specific Learning Disorder (SLD) and awareness questionnaire for parents and teachers the content validity of the tools was determined by experts in the field of psychology, medicine and education. They suggested certain modification, after which they agreed that the items in the tool were good enough to measure the specific learning disorder in children and awareness about specific learning disorder among parents and teachers. The translated Tamil version of the questionnaires was also evaluated. The reliability of the tool was established using the test-retest method. The pilot study enabled the researcher to check the reliability of the scales used for the study. The data was analyzed and the scales were found to be highly reliable. The results showed a significant relationship between the variables. Using test-retest method, reliability correlation coefficient for Specific Learning Disorder assessment for children was 0.76 and for teacher's awareness questionnaire was 0.71 and for parent's awareness questionnaire was 0.78. These correlation coefficients are high and proved to be a suitable tool for assessing learning problem in school children and awareness among teachers and parents.

3. 12. PROCESSING AND ANALYSIS OF DATA

Data was collected using multistage cluster sampling method. Data were recorded on the paper form and later transferred to Statistical Package for the Social Sciences (SPSS), version 16.0, Additive Model for Location, Scale and Shape (*GAMLSS*) package in R software version 2.15.1, EPI INFO version 3.5.1 were used²⁵⁸. All the tests were 2-tailed, and a p value of less than 0.05 was taken as statistically significant.

Students, parents and teachers demographic information were given in frequencies with their percentages. Students SLD score was given mean and standard deviation. Parents and teachers SLD awareness score were given in mean and standard deviation. Prevalence of SLD was given mean with 95% Confidence interval and proportion with 95% confidence interval. SLD Difference between urban and rural children was calculated using student's independent t-test. SLD Difference between CBSE and SB children was calculated using student's independent t-test. Language and Mathematics SLD difference were calculated using one-way analysis of variance, F-test. Prevalence of parents SLD awareness was calculated using mean with 95% Confidence interval and proportion with 95% confidence interval. Parents SLD awareness association with demographic variables was calculated using chi-square test. Prevalence of teachers SLD awareness was calculated using mean with 95% Confidence interval and proportion with 95% confidence interval. Teachers SLD awareness association with demographic variables was calculated using chi square test.

3.13. INCLUSION CRITERIA

Boys and girls from class's two to six, studying in CBSE and SB English medium (urban and rural) schools. Parents of children assessed for SLD in urban and rural Schools. Teachers selected from CBSE and SB schools (rural and urban). Checklist of the inclusion and exclusion criteria will be given to the class teachers / principals for selection of students.

3.14. EXCLUSION CRITERIA

Students detained in the same class and was absent from school for a long period (due to illness).

Students with a history of head injury, brain-tumour, epilepsy, with visual or hearing impairment

Students whose parent did not gave consent for their child and themselves.

Teachers who did not gave consent.

3.15. ETHICAL CONSIDERATION

Written permission was taken from the schools selected for the study. Written consent was taken from the parents and on behalf of the child for screening SLD in children and awareness among parents (as selected student samples were below 18 years). Written consent was also taken from the teachers.

Confidentiality and privacy about the students were maintained and student assessment sheets were not disclosed with the school authorities. A brief report was given to school authorities for further management of children with a learning disorder.

RESULTS AND DISCUSSION

This chapter deals with the outcome of the data analysis and the interpretation of the results. The results are presented in the following sequences:

4.1. General Profile of the Students

4.2. General profile of the parents

a. Fathers Details

b. Mothers Details

4.3. General profile of the teachers

4.4. Prevalence of SLD among school children

4.5. Awareness of SLD among parents

4.6. Awareness of SLD among teachers

4. 1. General profile of the students

A sample of 800 students selected from urban and rural areas studying in class's two to six of the Central Board of Secondary Education (CBSE) and State Board (SB) Schools. Equal number of boys and girls were studied. The characteristics of the samples are described in the following tables.

Table 9 - Frequency and percentage of school children according to the type of school, gender and class

Students Details		Place			
		Rural		Urban	
		N	Percent	N	percent
Type of School	CBSE	200	50.0%	200	50.0%
	SB	200	50.0%	200	50.0%
Gender	Male	200	50.0%	200	50.0%
	Female	200	50.0%	200	50.0%
Class	II	80	20%	80	20%
	III	80	20%	80	20%
	IV	80	20%	80	20%
	V	80	20%	80	20%
	VI	80	20%	80	20%

4.2. General profile of the parents

Among the sample of 800 parents participated in the study (both father and mother) information related to the parents was collected to see any significance difference in the awareness of Specific Learning Disorder (SLD) in comparison to their demographic information related to the fathers and mothers.

4.2a. Fathers Details: The details such as age, education qualification, occupation and income of the fathers of children assessed for Specific Learning Disorder (SLD) are presented in the following table.

Table 10 - Represents the Father's Details

Fathers Details		No. of fathers	Percent
Age	21 -30 years	32	4.0%
	31 -40 years	428	53.6%
	41 -50 years	322	40.4%
	51 -60 years	16	2.0%
Education Qualification	Illiterate	33	4.1%
	5 -10 std	180	22.6%
	11 -12 std	134	16.8%
	UG	249	31.2%
	PG	127	15.9%
	Diploma	75	9.4%
Occupation	Agriculture	13	1.6%
	Private	92	11.5%
	Government	86	10.8%
	Self employed	10	1.3%
	Business	322	40.4%
	Professional	137	17.2%
	Skilled	69	8.6%
	Unskilled	18	2.3%
	Labour	51	6.4%
Income	< Rs.50000	104	13.0%
	Rs.51000 – 100000	178	22.3%
	Rs.100001 – 200000	275	34.5%
	Rs.200001- 500000	208	26.1%
	Rs.500001- 1000000	33	4.1%

Fathers' Age

There were 53.6 percent of fathers aged between 31 to 40 years and 40.4 percent between 41-50 years and only four percent and two per cent fathers were between 21-30 and 51-60 years respectively.

Fathers' Education qualification

It is seen from the table that 31.2 percent fathers were under-graduates; whereas 22.6 percent had minimum education (5th to 10thstd). A small percentage (4.1percent) of fathers are illiterates and never been to school. Education qualification up to higher secondary and post-graduation was among 16.8 percent and 15.9 percent fathers respectively. The group also consists of diploma holder with 9.4 percent.

Fathers' Occupation

Majority (40.4%) of the fathers were engaged in their own business, 17.2 percent were professionals, 11.5 percent and 10.8 percent of them worked for private and government sector respectively. It is also seen that few fathers were agriculturist (1.6%), 8.6 percent and 2.3 percent were skilled and unskilled workers, self-employed was 1.3 percent and labour / coolies were 6.4 percent.

Fathers' Income

Among the fathers a majority of 34.5 percent had an annual income between Rs.1,00,001/- to Rs.2,00,000/-, 26.1 percent had annual income between Rs.2,00,001/- to Rs.5,00,000/-, 22.3percent had income between Rs.51,000/- to Rs.1,00,000/- while 13 percent had a minimum income less than Rs.50,000/- and only 4.1 percent had an annual income above Rs.5,00,000/-

4.2b. Mothers Details: The details such as age, education qualification, Occupation and income of the mothers of children assessed for specific learning disorder are presented in the following table.

Table 11 - Represents the Mother's Details

Mothers Details		No. of mothers	Percent
Age	21 -30 years	191	23.9%
	31 -40 years	560	70.2%
	41 -50 years	47	5.9%
Education Qualification	Illiterate	15	1.9%
	5 -10 std	256	32.1%
	11 -12 std	137	17.2%
	UG	279	35.0%
	PG	86	10.8%
	Diploma	25	3.1%
Occupation	Others	198	24.8%
	Housewife	600	75.2%
Income	No Income	598	74.9%
	< Rs.50000	35	4.4%
	Rs.51000 - 100000	60	7.5%
	Rs.100001 - 200000	72	9.0%
	Rs.200001- 500000	31	3.9%
	Rs.500001- 1000000	2	0.3%

Mothers' Age

From the sample 70.2 percent mothers were aged between 31 to 40 years and 23.9 percent were between 21-30 years and 5.9 percent were between 41-50 years of age.

Mothers' Education Qualification

The sample of mothers' 35 percent mothers were under-graduate; whereas 32.1 percent were with minimum education (5th to 10thStd), while 17.2 percent and 10.8 percent were with higher secondary and post-graduate education qualification respectively. Among the sample a small number of mothers (3.1%) were diploma holders.

Mothers' Occupation

Three fourth (75.2%) of the mothers were house wife and one fourth (24.8%) were employed with nature of job from maids to professionals.

Mothers' Income

One fourth of the mothers who were working, had an income ranging from Rs.50,000 to Rs.10 lakh per annum depending upon their nature of work.

4.3. General profile of the teachers

Samples of 300 teachers participated in the study on awareness of SLD and table 12 shows the information about the teachers' age, gender, type of school, place (rural / urban), education qualification, occupation, work experience, class handling and subject teaching. The sample also includes principals, vice-principals and

headmasters who participated in the study as they too handle classes apart from school administrative job.

Table 12 - Represents the Teachers Details

Teachers Details		No. of Teachers	percent
Place	Rural	100	33.3%
	Urban	200	66.7%
Type of school	CBSE	150	50.0%
	SB	150	50.0%
Gender	Male	78	26.0%
	Female	222	74.0%
Age	21 -30 yrs	78	26.0%
	31 -40 yrs	106	35.3%
	41 -50 yrs	73	24.3%
	51 -60 yrs	43	14.3%
Occupation	Principal	8	2.7%
	Head master	8	2.7%
	Vice principal	8	2.6%
	Teacher	276	92.0%
Qualification	High school	5	1.7%
	UG	95	31.7%
	PG	181	60.3%
	Diploma	19	6.3%
Work Exp	< 10 years	166	55.3%
	11 - 20 years	83	27.7%
	21 - 30 years	43	14.3%
	> 30 years	8	2.7%
Class handling	1-5	134	44.7%
	6 - 10	128	42.7%
	> 10	38	12.6%
Subject teaching	All subjects	52	17.3%
	Arts	127	42.3%
	Maths	39	13.0%
	Science	71	23.7%
	Computer	11	3.7%

Place (Rural / Urban)

It is seen that majority 66.7 percent of the teachers hailed from urban schools (CBSE & SB) and only 33.3 percent of them belonged from rural schools (CBSE & SB).

Type of school

Equal teachers sample participated from both Central Board of Secondary Education (CBSE) and State Board (SB) schools.

Gender

There were majority 74 percent of females constituted the total teachers sample and among them 26 percent were males.

Age group

Among the participants 35 percent of the teachers belonged to ages 31 to 40 years, 26 percent belonged to ages 21-30 years with 24.3 percent were in the age group 41-50 years and only 14.3 percent were from 51-60 years age group.

Occupation

Of the total population majority 92 percent were teachers whose role is only to handle different subjects and classes and remaining sample were 2.7 percent principal, 2.7 percent vice-principal and 2.6 percent head masters.

Educational qualification

Among the sample 60.3 percent teachers had completed their post-graduate education. 31.7 percent teachers had completed under-graduation while 6.3 percent had done diploma and only 1.7 percent had completed high school education.

Teaching Experience

Result revealed that 55.3 percent of the teachers had less than 10 years experience and only 2.7 percent had experience above 30 years. There teachers who had teaching experience between 11-20 years (27.7%) and 14.3 percent had teaching experience between 21-30 years.

Class Handling

It is seen from the table that 44.7 percent of the teachers were handling primary class students (class one to five) while 42.7 percent were handling high school students (classes 6 to 10) and only 12.6 percent were handling classes above 10th.

Subjects Teaching

Table 12 also shows that 42 percent of the teachers were teaching arts (English & Tamil), 23 percent were handling science for students, 17.3 percent were teaching all subjects, 13 percent were teaching Mathematics and only 3.7 percent were teaching computer.

PREVALENCE OF SPECIFIC LEARNING DISORDER (SLD) AMONG SCHOOL CHILDREN RESULTS AND DISCUSSION

The study attempted to know the prevalence of specific learning disorder in children from class's two to six of English medium schools following different educational pattern (Central Board of Secondary Education & State Board) in urban (Chennai) and rural (Thiruvallur) region.

Table 13 - Overall Specific Learning Disorder (SLD) prevalence among school children

Maximum Score	Mean SLD score	Mean difference with 95% CI	Percentage mean difference with 95% CI
500	82.10	82.10 (78.31 - 85.88)	16.4% (15.7% - 17.2%)

The table 13 shows the overall prevalence of Specific Learning Disorder (SLD) is 16.4 percent among school going children, which is more when compared with DSM-V, 2013² and the previous studies conducted in India^{134,135,196,246}. Despite better infrastructure facilities being provide in school, the reasons may be due to various teaching methodologies, overcrowded class-room (children do not receive individual attention from teachers) and students neglected because of their disorder. Different criteria applied for the diagnosis of SLD and lack of awareness among parents and school teachers further makes it difficult to identify children with SLD.

Table 14 - Overall Specific Learning Disorder (SLD) prevalence in different subjects (English, Tamil, Mathematics) among school children

Subjects	Maximum Score	Mean LD score	Mean difference with 95% CI	percentage mean difference with 95% CI
English	180	22.13	22.13 (20.72 - 23.52)	12.3% (11.5% - 13.1%)
Tamil	179	39.38	39.38 (37.45 - 41.30)	22.0% (20.9% - 23.1%)
Mathematics	141	20.60	20.60 (19.44 - 21.74)	14.6% (13.8% - 15.4%)

The above table depicts the prevalence of Specific Learning Disorder (SLD) in Tamil was high with 22 percent while it was 14.6 percent in Mathematics and a lowest prevalence was in English with 12.3 percent. This variation in percentage may be due to exposure of subjects. Children are exposed to English language for maximum time (4 hours) in school when compared to Tamil as the duration last for only 45 minutes a day. Though most of them had Tamil as they mother tongue (regional language), but high prevalence in Tamil may be due to the differences between spoken and written language. The prevalence of Mathematics (14.6%) challenged the others studies^{127,152,199} which reported 10.5 percent, 2.4 percent and 13.9 percent respectively, with a nearing percentage of 15.54 per cent in another study¹³⁵. The prevalence of mathematics disorder was reported much higher in two different studies with 74 per cent and 40 per cent respectively^{201,250}.

Graph 2 – Percentage of Specific learning Disorder in English, Tamil and Mathematics among school children.

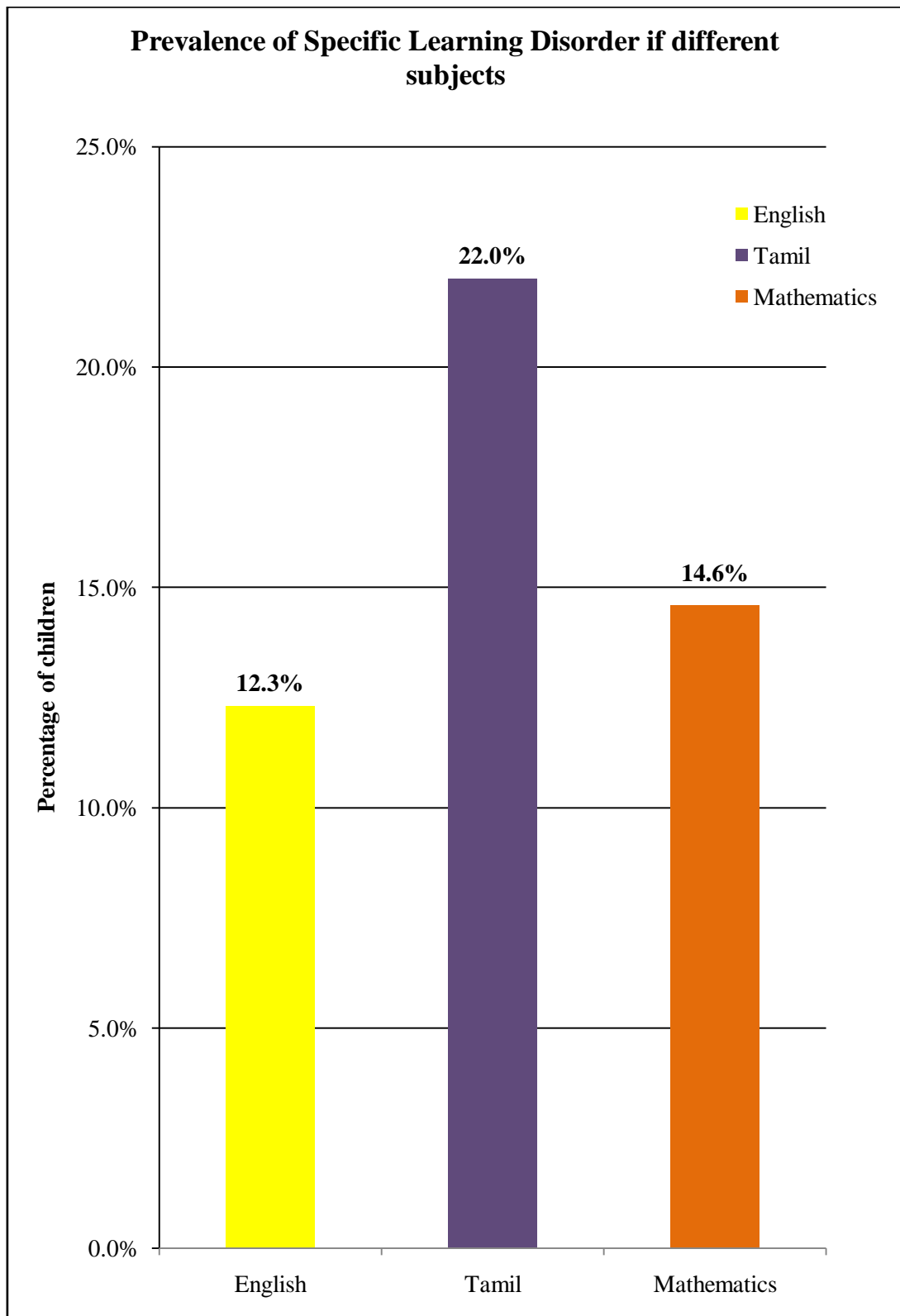


Table 15 - Percentage and mean score of Specific Learning Disorder prevalence among rural and urban school children.

Overall Prevalence of SLD	Overall Total Score	Rural (Thiruvallur)		Urban (Chennai)	
		Mean	Percent	Mean	Percent
	500	85.87	17.2%	78.33	15.7%

Table 15 depicts the overall percentage and means scores of SLD among children studying in rural (Thiruvallur) and urban (Chennai) schools. The overall prevalence of SLD was 17.2 percent among rural school children and 15.7 percent among urban school children.

Graph 3 - Percentage of Specific Learning Disorder prevalence among rural and urban school children.

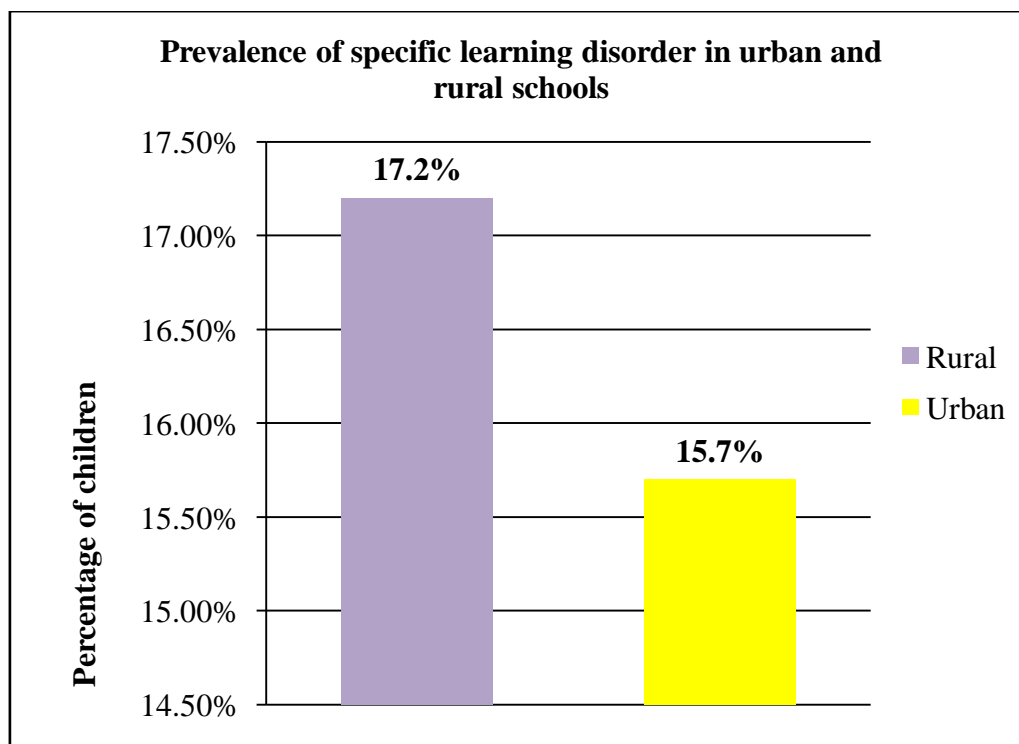


Table 16 - Comparison of Specific Learning Disorder Scores among rural and urban school children

Place	No. of students	Mean	SD	Mean Difference	Student independent t-test
Rural	400	85.87	54.30	7.54	t=1.96p=0.05*
Urban	400	78.33	54.57		

* Significant at $P \leq 0.05$

The above table 16 showed the mean scores of 85.87 among rural and 78.33 among urban school children with 7.54 score difference. The prevalence of SLD was high among the rural school children when compared to urban children. This significant difference was statistically calculated using student independent t-test. This difference may be due to lack of SLD awareness among parents & teachers and non-availability of remedial facilities in rural schools. Therefore, **major hypothesis 1 is confirmed.**

The above results were much higher (rural 17.2% & urban 15.7%) to the results of the study by Jacob H, Bzufka and Neumarker (2000), which found equal prevalence rate of SLD (6.6% & 6.59%) among rural and urban German school children²⁰⁵.

Table 17 - Percentage and mean score of Specific Learning Disorder prevalence among CBSE and SB school children.

Overall Prevalence of SLD	Overall Total Score	Central Board of Secondary Education (CBSE)		State Board (SB)	
		Mean	Percent	Mean	Percent
	500	66.89	13.4	97.31	19.5

The above table 17 showed the percentage of overall prevalence of specific learning disorder was 13.4 percent among CBSE and 19.5 percent among SB school children. The overall prevalence of SLD was high among SB than in CBSE school children. This difference can be due to parental involvement given to children studying in CBSE schools. The other consideration is that the CBSE syllabus is relatively tough than SB syllabus. Hence, there are more chances for the parents whose children studying in CBSE schools pay individual attention at home and arrange for extra tuitions.

Graph 4 - Percentage of Specific Learning Disorder prevalence among CBSE and SB school children.

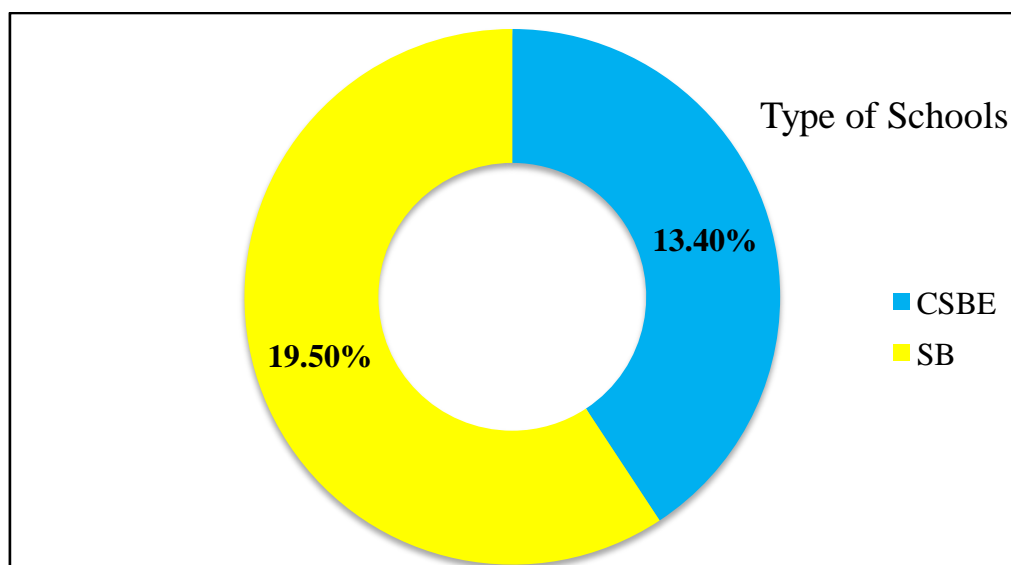


Table 18 - Comparison of Specific Learning Disorder Scores among CBSE and SB school children

Overall prevalence	Type of Schools				Difference	Student independent t-test
	CBSE		SB			
	Mean	SD	Mean	SD		
	66.89	43.03	97.31	60.33		

*** Significant at $P \leq 0.001$

In table 18 the overall mean score was high among the SB (mean 97.31) when compared to CBSE (mean 66.89) with a mean difference of 30.42. There was a very high significant difference in overall SLD scores among SB and CBSE school children. This difference was calculated using student independent t-test. State Board children have high rate of SLD prevalence when compared to the CBSE school children. Therefore, **minor hypothesis 1A** “there will be a significant difference in the prevalence of specific learning disorder between CBSE and SB school children” **is confirmed.**

Gender

The results of ‘t’ test carried out to compare the gender difference in the prevalence of Specific Learning Disorder among urban and rural school children are elicited in the table 19.

Table 19 - Comparison of prevalence of specific learning disorder of the rural and urban school children based on gender

Place	No. of students	Gender				Mean difference	't' value
		Male		Female			
		Mean	SD	Mean	SD		
Rural	400	89.86	56.21	81.80	52.11	8.06	1.48 NS
Urban	400	83.33	57.45	73.43	51.26	9.90	1.82 NS

NS – Not Significant

It is seen from the table 19 that there is no significant difference in the prevalence of Specific Learning Disorder among boy and girls studying in rural and urban schools, which are depicted by the 't' values of 1.48 and 1.82 respectively.

The above results challenges with the results of the studies by Dhanda and Jagawat (2013) and Moll, et al (2014) that states no significant difference detected in the prevalence of specific learning disorder between boys and girls^{135,197}. But it was contrary to the results of the studies by Dilshad (2006); Muzammil, Kishore and Semwal (2009); Priti et al (2013); Smith (2004); Mahin, Haghdoost, Afsaneh and Hamideh (2014); Cappa, et al (2015); Fortes, et al (2015) that shows significant difference in the prevalence of specific learning disorder between the gender^{135,245,244,203,152,196,168}. The research suggesting an equal incidence of SLD among boys and girls could be related to possible medical, maturational, sociological and other cognitive factors.

From the above inferences, **minor hypothesis 1B**, “There will be a significant difference in the prevalence of Specific Learning Disorder between boys and girls studying in rural and urban schools” is **not confirmed**.

Class

The comparison of prevalence of Specific learning disorder among students studying in class two to six in rural and urban schools was assessed through one-way analysis of variance and the results are given in the table.

Table 20 - Comparison of specific learning disorder prevalence among students studying in class two to six in rural and urban schools

Place	Class	N	Mean	Std. Deviation	F-test
Rural	II std	80	105.1375	78.21550	F=5.65 P=0.001***
	III std	80	87.0625	57.47544	
	IV std	80	91.1125	43.47879	
	V std	80	78.7375	36.84169	
	VI std	80	67.3000	37.65916	
	Total	400	85.8700	54.30221	
Urban	II std	80	96.2250	66.79971	F=10.39 P=0.001***
	III std	80	97.8625	54.33365	
	IV std	80	71.8625	46.13814	
	V std	80	72.6250	45.15890	
	VI std	80	53.0750	45.00148	
	Total	400	78.3300	54.56849	

*** Significant at $P \leq 0.001$

The data recorded in table 20 present a significant difference in the prevalence of specific leaning disorder among children studying in different classes (class two to six) in rural ($F = 5.65$) and urban ($F = 10.39$) schools. The SD was high among class two and low among children studying in class six. This implies that the prevalence of learning problem has an influence on the class the student studying irrespective of the region. It is also clear from table 20 that the SD scores decreases as the class of the children class level increases.

The above findings lead to the inference that **minor hypothesis 1C**, “There will be a significant difference in the prevalence of specific learning disorder among children studying in different classes” class two to six in rural and urban schools” is **confirmed**. This may be the result of adjustment process where the problem decreases as the age / class advances.

Different Subjects

The comparison of the prevalence of Specific learning disorder in different subjects (English, Tamil and Mathematics) among rural and urban school children was analyzed using student independent t-test.

Table 21 - Comparison of Specific Learning Disorder prevalence in different subjects among rural and urban school children

Subjects	RURAL		URBAN		Mean difference	‘t’ value
	Mean	SD	Mean	SD		
English	25.45	21.38	18.81	18.41	6.64	t=4.70***
Tamil	37.02	24.91	41.74	30.15	4.73	t=2.42*
Mathematics	23.41	18.75	17.79	13.55	5.62	t=4.86 ***

* Significant at $P \leq 0.05$ *** Significant at $P \leq 0.001$

The above table 21 shows that there is a significant difference in the scores of Tamil among rural ($M=37.03$, $SD=24.91$) and urban ($M=41.74$, $SD=30.15$) school children with $t=2.42$, $p=0.02$. Results show that more children from urban schools have SLD in Tamil than rural children. This may be due to limited usage of Tamil language among the urban population, as parents and teachers insist children to communicate in English. Whereas it is vice-versa in rural as parents and teachers use Tamil quite often for communication. This is proved in the above results with more rural children exhibited difficulty in English. There was a very high significant difference in the scores of English among rural ($M=25.45$, $SD=21.38$) and urban ($M=18.81$, $SD=18.41$) school children with $t=4.70$, $p=0.001$.

Results suggested, though English being medium of instruction among urban and rural students still there is high prevalence of SLD in English among rural children. There was a very high significant difference seen in prevalence of SLD in Mathematics among rural and urban school children with $M=23.41$ ($SD=18.75$) and $M=17.79$ ($SD=13.55$) respectively. Results show more children from rural school have difficulty in mathematics when compare to urban children. This may be due to lack of facilities (smart board, use of manipulative, etc). Hence, **minor hypothesis 1D (i)**, “There will be a significant difference in the prevalence of SLD in English, Tamil and Mathematics among urban and rural school” is **confirmed**.

Graph 5 - Comparison of Specific Learning Disorder prevalence in different subjects among rural and urban school children

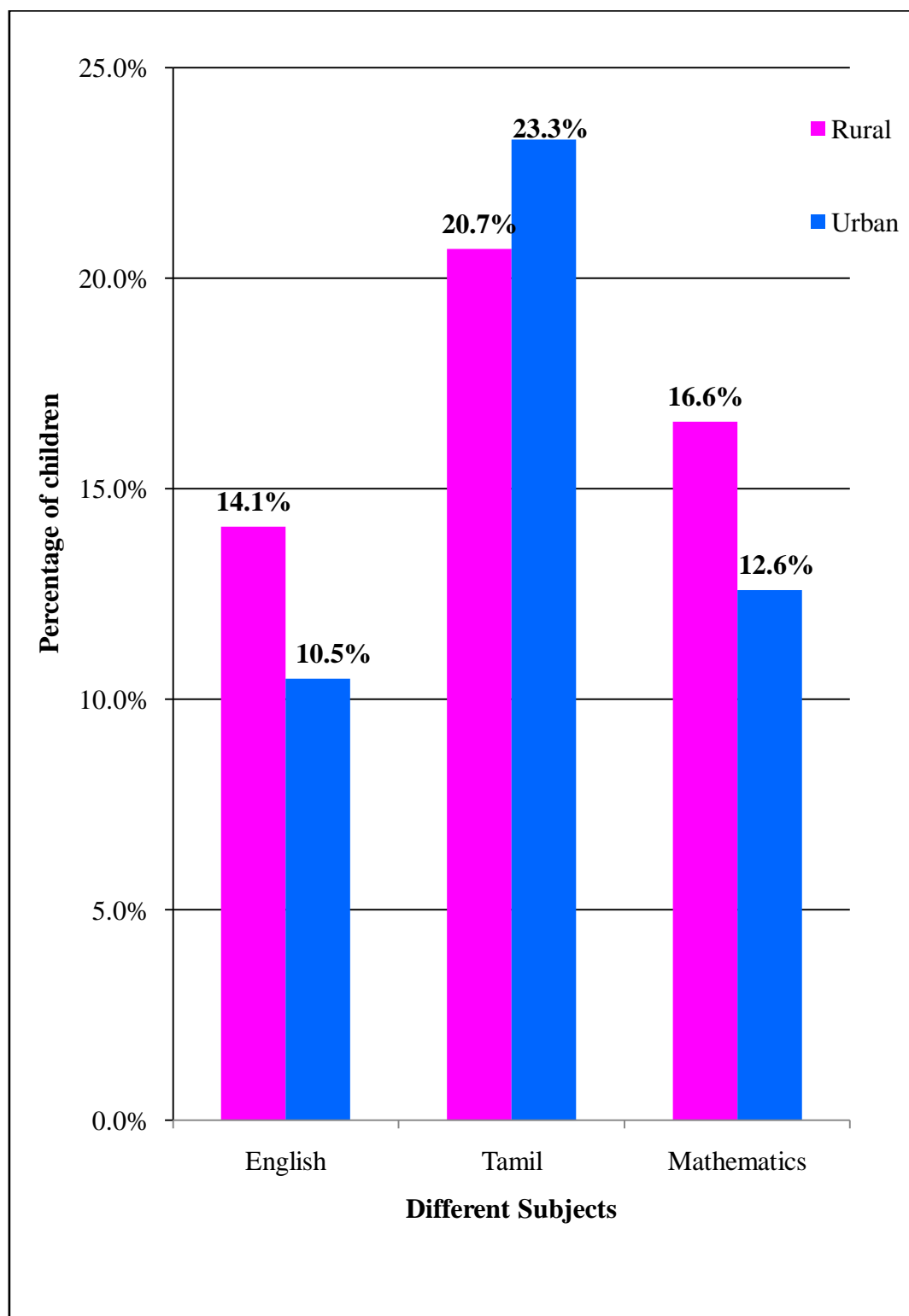


Table 22 - Comparison of Specific Learning Disorder prevalence in different subjects among CBSE and SB school children

Subjects	Type of Schools				Difference	Student independent t-test
	CBSE		SB			
	Mean	SD	Mean	SD		
English	17.86	15.39	26.39	23.34	8.53	t=6.09***
Tamil	32.27	24.37	46.48	29.07	14.21	t=7.50***
Mathematic	16.75	12.09	24.44	19.38	7.69	t=6.37***

*** Significant at $P \leq 0.001$

In table 22 mean and SD scores of English, Tamil and Mathematics of children from SB and CBSE are presented. The mean score was high (46.48) in Tamil among SB than in CBSE (32.27) school children. There was a very high significant difference seen between SLD in Tamil among SB and CBSE school children ($p=0.001$). This statistically difference was calculated using student independent t-test.

The mean score was high in English among SB (26.39) than CBSE (17.86) school children. Hence a very high significant difference was seen between SLD in English among SB and CBSE school children with $t=6.09$, $p=0.001$. This was calculated using student independent t-test. In mathematics, the SB students had high mean ($m=19.38$) and it was low among the CBSE student. There was a significant difference in the prevalence of SLD in mathematics among CBSE and SB students and this statistical difference was calculated using student independent t-test. Hence, **minor hypothesis 1D (ii)**, “There will be a significant difference in the prevalence of SLD in English, Tamil and Mathematics among CBSE and SB schools” is **confirmed**.

The above results prove that children studying in SB are likely to have more learning problem when compared to CBSE school children. The reason for CBSE students less prone to SLD may be due to the activity based learning that is been conducted since its inception. Parental involvement in giving more information to their children on various areas and in this study we found that parents of CBSE students have better awareness on SLD, which may in turn help in identification of children with learning problem.

Graph 6 - Percentage of Specific Learning Disorder prevalence in different subjects among CBSE and SB school children.

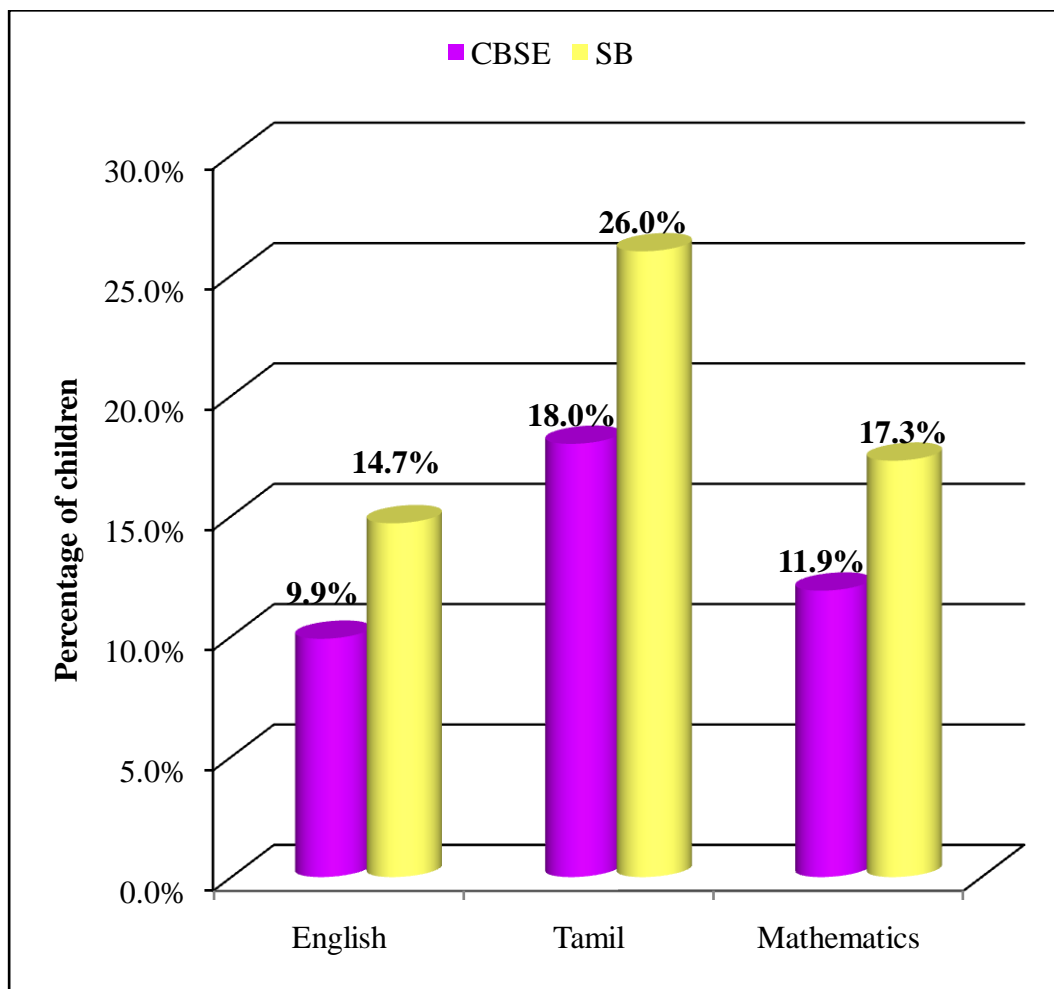


Table 23 - Association between SLD and with regard to the type of school, Class and Gender of children in rural and urban schools

Students Information		Place				Chi square test
		Rural		Urban		
		N	percent	N	Percent	
Type of school	CBSE	200	50.0%	200	50.0%	$\chi^2=0.00$ p=1.00
	SB	200	50.0%	200	50.0%	
Class	II std	80	20.0%	80	20.0%	$\chi^2=0.00$ p=1.00
	III std	80	20.0%	80	20.0%	
	IV std	80	20.0%	80	20.0%	
	V std	80	20.0%	80	20.0%	
	VI std	80	20.0%	80	20.0%	
Gender	Male	200	50.0%	200	50.0%	$\chi^2=0.00$ p=1.00
	Female	200	50.0%	200	50.0%	

From the above table 23 it is clear that the demographic variables like type of school, class and gender^{135,197} of children studying in rural and urban schools had no significant association with the prevalence of SLD. This was statistically calculated using chi-square test (p=1.00). Hence, **minor hypothesis 1E**, ‘there will be a significant association between demographic variables of school children with regard to specific learning disorder’ **is not confirmed**.

4.5. AWARENESS ON SLD AMONG PARENTS - RESULTS AND DISCUSSION

Awareness on specific learning disorder among parents (both father and mother) is important to understand the difficulty experienced by children in academic, facilities offered to dyslexic children, sources through which parents get information and how they perceive the difficulty related to academic among school children.

Table 24 - Mean, SD and mean percentage of awareness on SLD among parents in the domains of media, facilities, academic and perception

Domains	Awareness on SLD			
	Maximum score	Mean	SD	percent of mean score
Media	1	0.61	.49	61.0%
Facilities	2	1.14	.80	57.0%
Academic	6	4.38	2.36	73.0%
Perception	15	8.48	3.45	56.5%
Total	24	14.61	6.27	60.9%

Table 24 shows the awareness on SLD among parents under various domains such as media, facilities, academic and perception. Majority (73%) of parents had awareness on questions related to academic difficulties in children. The mean percentage on media was 61percent (TV, Internet, Magazine, Radio) as their source of information on SLD and 57 percent parents had awareness on the facilities provide for children with Specific Learning Disorder and 56.5 percent perceived SLD was related to various other medical conditions. The overall awareness on SLD among parents on various domains is found to be 60.9 percent.

**Graph 7 - Percentage of awareness on specific learning disorder among parents
in the domains of media, facilities, academic and perception**

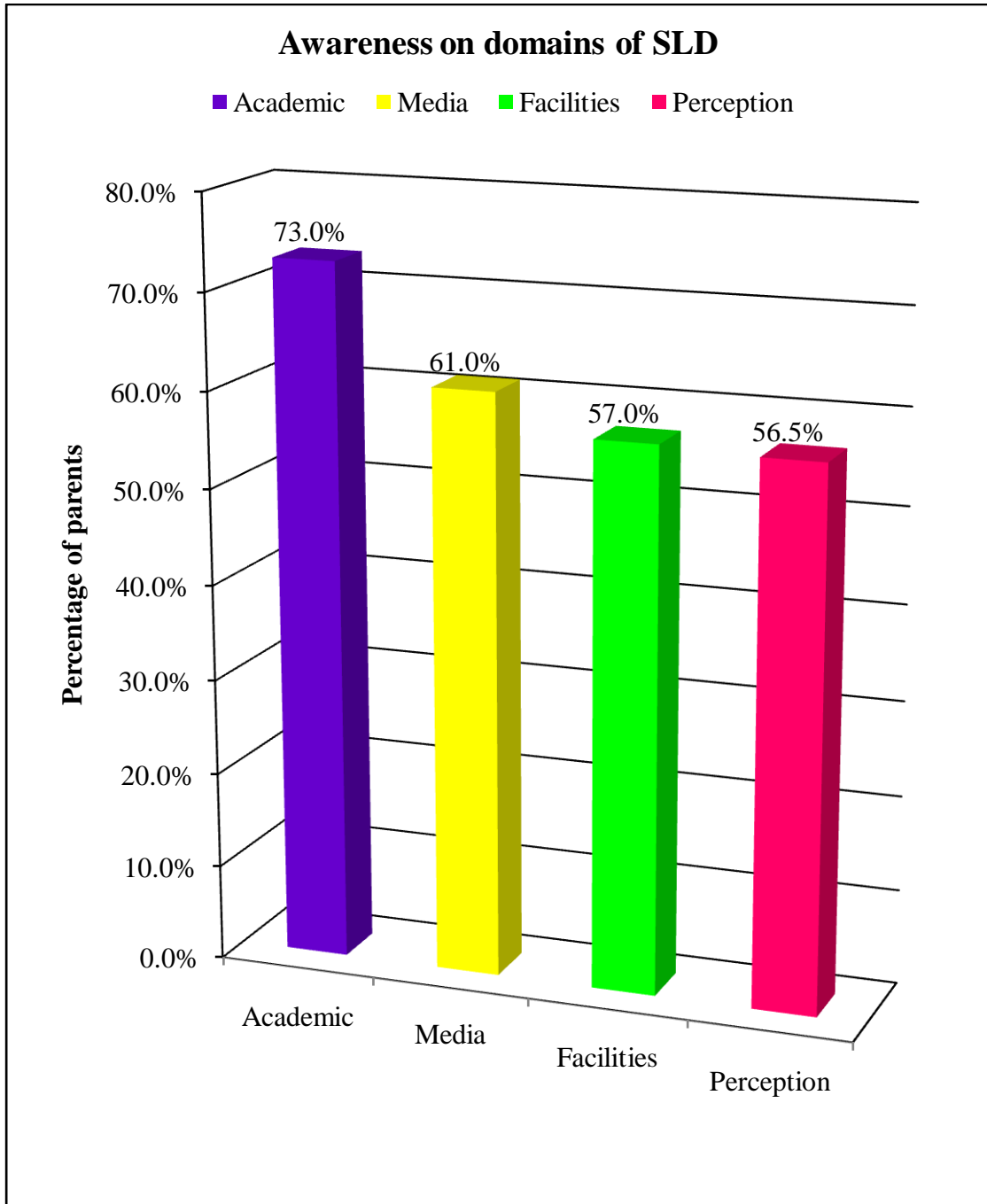


Table 25 depicts the mean score on 24 items related to the awareness on SLD was 14.46 and mean percentage score with 95 percent CI was 60.87 percent. Overall 60.87 percent parents had awareness on SLD.

Table 25 - Mean and overall percentage of awareness on SLD among parents

Maximum score	Mean score	Mean score with 95% CI	Percentage of mean score with 95% CI
24	14.61	14.61(14.17 -15.04)	60.87% (59.04%-62.67%)

The overall awareness on specific learning disorder between parents of children studying in rural and urban schools was compared using ‘t’ test and the results are tabulated in the table 26.

Table 26 – Comparison of awareness on SLD between rural and urban school parents

Place	No. of parents	SLD awareness		Difference	Student independent t-test
		Mean	SD		
Rural	400	14.47	6.16	1.47	t=2.70p=0.01**
Urban	400	15.94	6.37		

** Significant at $P \leq 0.01$

Parents of children assessed for SLD from urban and rural CBSE (N=400) and SB (N=400) schools participated in the study. The mean score among rural and urban parents was 14.47 and 15.94 respectively with 1.47 differences. This difference was statically was calculated by student independent t-test. The results showed that there is a high significant difference in awareness of SLD among rural and urban parents. Therefore, **major hypothesis 2 is confirmed.** Urban parents have better awareness of

SLD when compared to rural parent's, this may be due to limited resources available in rural areas for parents to enhance their knowledge through book or attending workshop or training programme.

The study by Karande, Mehta and Kulkarni (2007) depicts that there is a significant improvement in the knowledge of specific learning disability among parents through awareness programme²⁵⁰.

Table 27 – Comparison of awareness on SLD between CBSE and SB school parents

Type of School	No. of parents	SLD awareness		Difference	Student independent t-test
		Mean	SD		
CBSE	400	15.09	5.56	0.97	t=2.20 p=0.03*
SB	400	14.12	6.87		

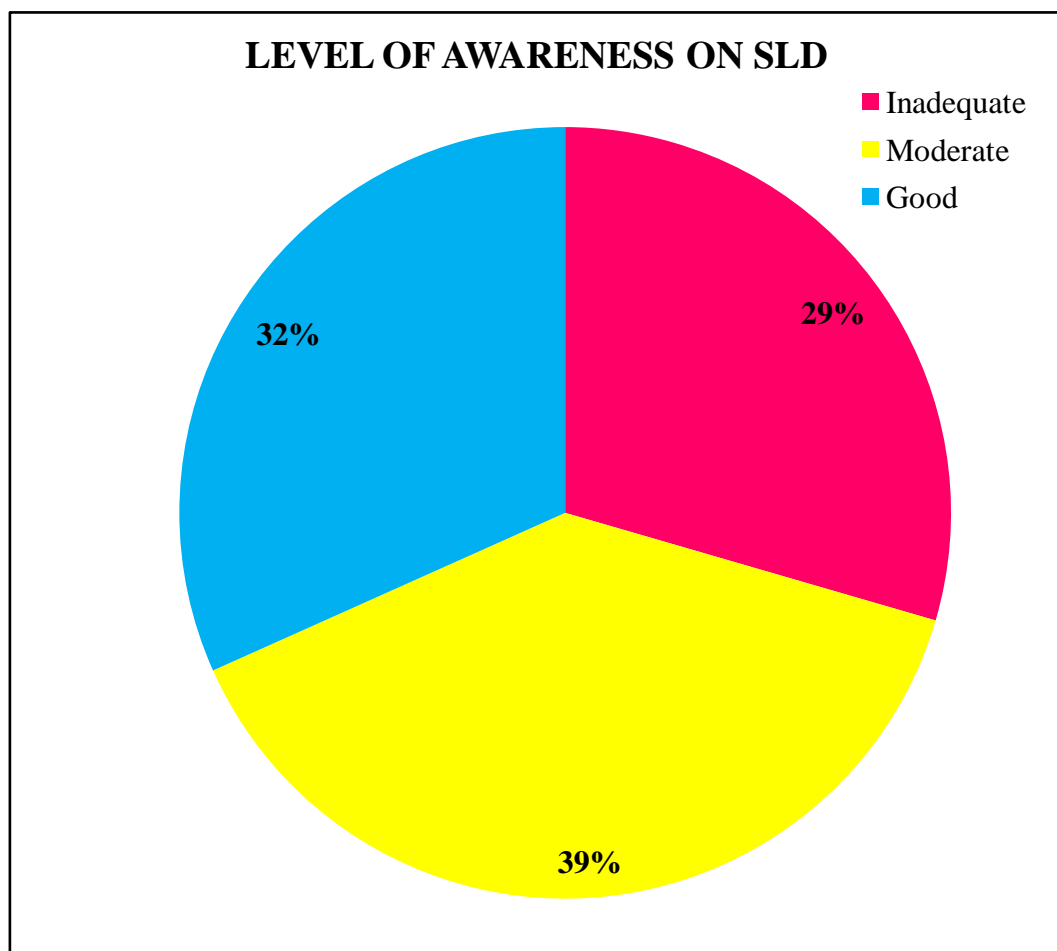
*Significant at $P \leq 0.05$

The above table 27 depicts the mean score of 15.09 and 14.12 among CBSE and SB parents respectively with 0.97 score difference. This difference shows that CBSE parents have better awareness when compared to SB parents. Therefore statistical results of student independent t-test show significant difference between CBSE and SB parents. Hence, **minor hypothesis 2a is confirmed**. This significant difference can be due to parental economic status, education that enables them to providing additional support to children (arranging special / remedial classes) and improving the home environment.

Level of awareness on Specific Learning Disorder (SLD) among parents

The level of awareness on specific learning disorder among parents is presented in percentage in graph 7. It is quite clear that 32 percent of the parents had good, 39 percent had moderate and 29 percent had inadequate level of awareness on SLD.

Graph 8 - Level of awareness on Specific Learning Disorder (SLD) among parents



The association between the level of awareness on specific learning disorder and the age among the fathers was found using percentage analysis and the results are recorded in table 28.

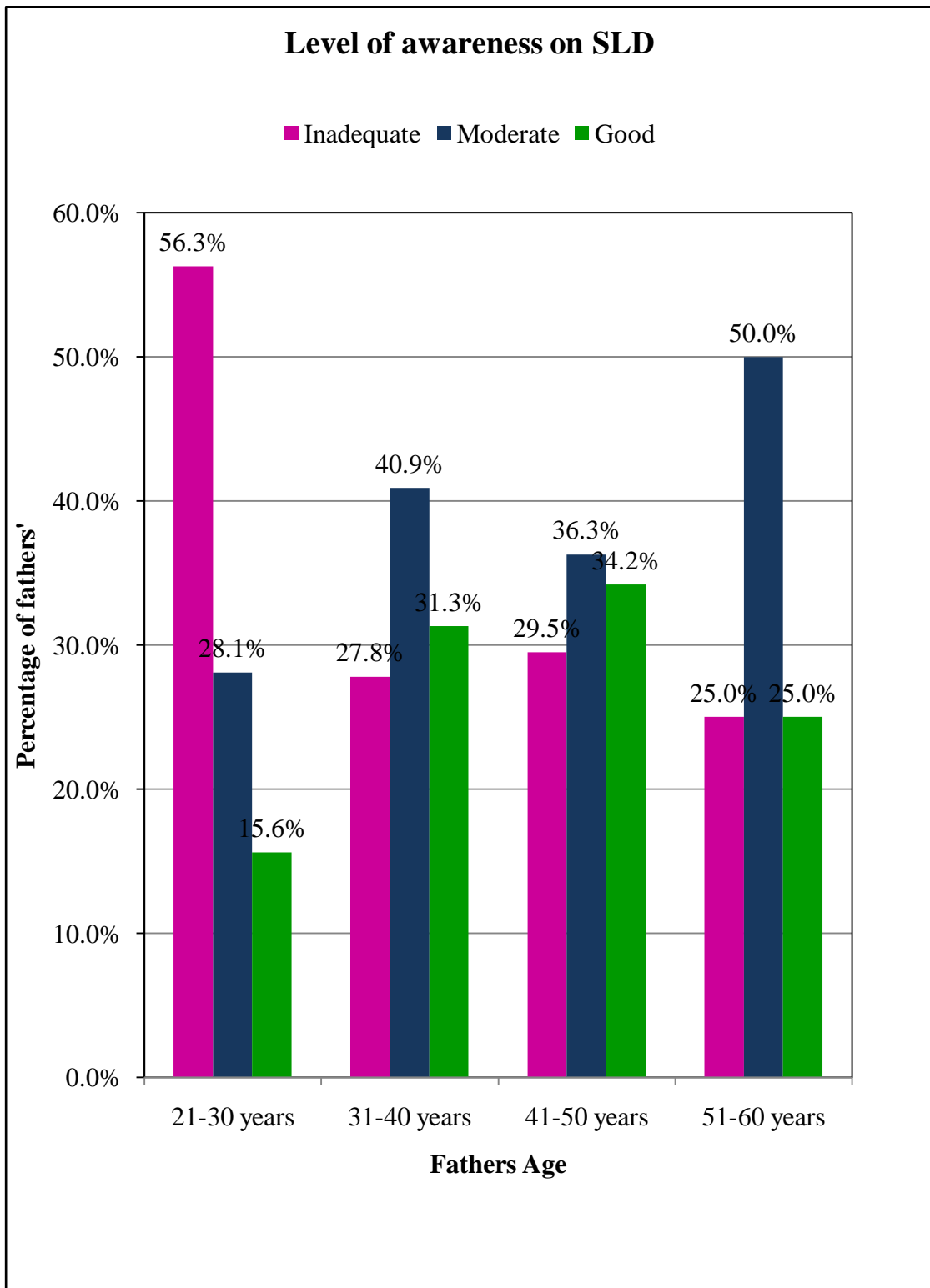
Table 28 - Association between fathers' age and level of awareness on specific learning disorder

Father age	Level of SLD awareness score						Total	Chi-square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
21 -30 years	18	56.3%	9	28.1%	5	15.6%	32	14.19*
31 -40 years	119	27.8%	175	40.9%	134	31.3%	428	
41 -50 years	95	29.5%	117	36.3%	110	34.2%	322	
51 -60 years	4	25.0%	8	50.0%	4	25.0%	16	

* significant at $P \leq 0.05$

The data tabulated above points out that 56.3 percent of the fathers ages between 21-30 years, 27.8 percent of fathers ages 31-40 years, 29.5 percent of the fathers ages between 41-50 years and 25percent of fathers between 51-60 years had inadequate level of awareness on SLD. Fifty percent of the fathers in the age group 51-60, 40.9 percent in age group 31-40 years, 36.3 percent in the age group 41-50 years and 28.1 percent of fathers in the ages 21-30 years had moderate level of SLD awareness. Fathers in the age group 21-30 years, 31-40 years, 41-50 years and 51-60 years (15.6%, 31.3%, 34.2% and 25%) respectively had good level of awareness on SLD. Results show that there is a significant association between father's age and level of awareness on SLD. Therefore, **minor hypothesis 2b (i) is confirmed.**

Graph 9 - Association between fathers' age and level of awareness on specific learning disorder



The association between the level of awareness on specific learning disorder and the education qualification among the fathers was found using percentage analysis and the results are recorded in table 29.

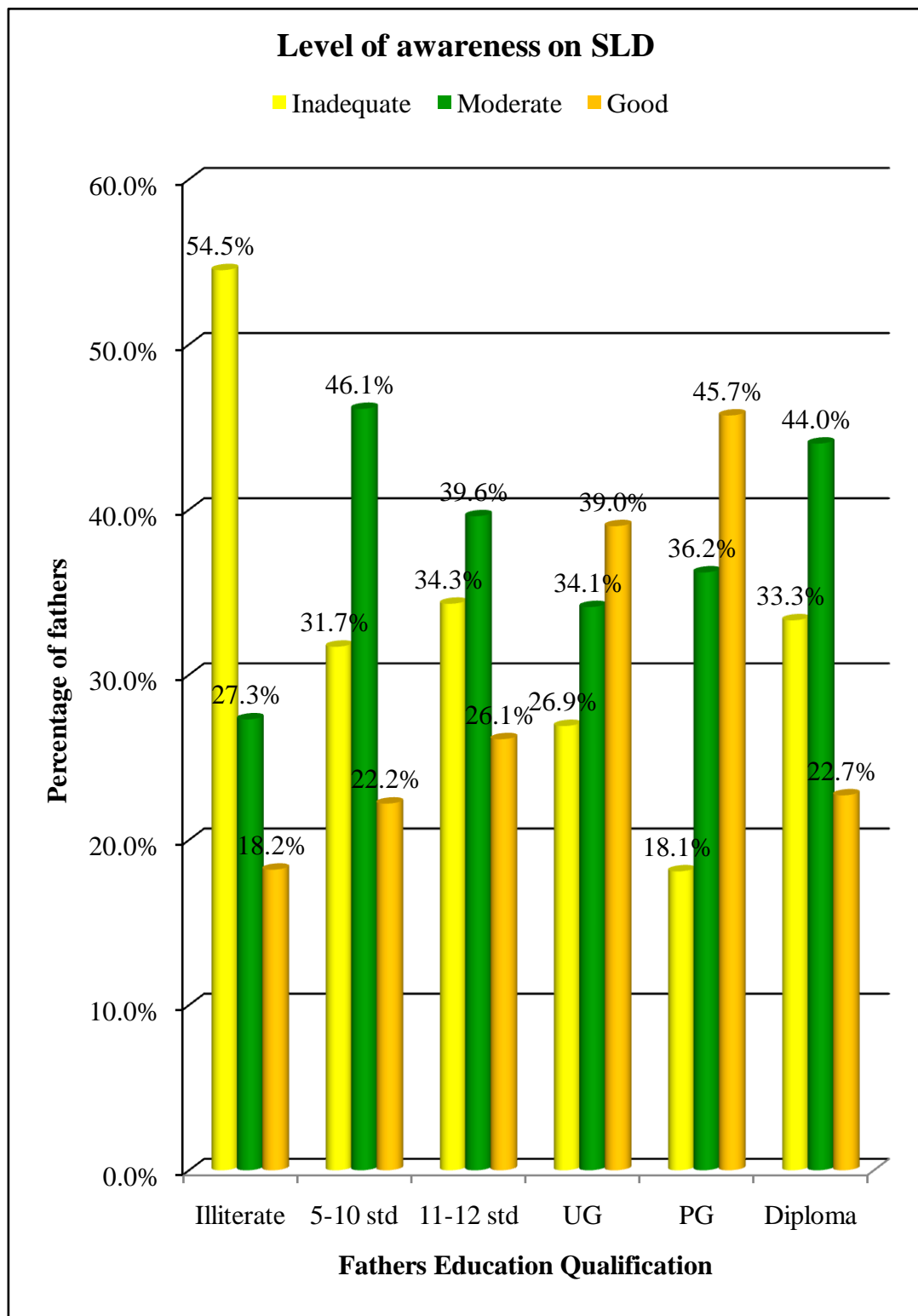
Table 29 - Association between fathers' education qualification and level of awareness on specific learning disorder

Father Qualification	Level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
Illiterate	18	54.5%	9	27.3%	6	18.2%	33	42.86***
5 -10 std	57	31.7%	83	46.1%	40	22.2%	180	
11 -12 std	46	34.3%	53	39.6%	35	26.1%	134	
Diploma	25	33.3%	33	44.0%	17	22.7%	75	
UG	67	26.9%	85	34.1%	97	39.0%	249	
PG	23	18.1%	46	36.2%	58	45.7%	127	

*** Significant at $P \leq 0.001$

The above table clearly depict that 54.5 percent of the illiterate fathers had inadequate level of SLD awareness while 46.1 per cent of the fathers with education between 5th to 10th standard had moderate level of awareness on SLD and 45 percent of the fathers with PG qualification had good level of awareness on SLD. The chi-square test value ($\chi^2=42.86$) indicates very highly significant association between fathers' education qualification and level of awareness on SLD. Hence, **minor hypothesis 2b (ii) is confirmed.**

Graph 10 - Association between fathers' education qualification and level of awareness on specific learning disorder



The cross tabulation done to find out the percentage distribution based on the level of awareness on specific learning disorder and father’s occupation is presented in following table.

Table 30 - Association between fathers’ occupation and level of awareness on specific learning disorder

Father Occupation	Level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	Percent		
Agriculture	5	38.5%	5	38.5%	3	23.1%	13	33.79*
Private	32	34.8%	34	37.0%	26	28.3%	92	
Government	25	29.1%	28	32.6%	33	38.4%	86	
Self-employed	5	50.0%	4	40.0%	1	10.0%	10	
Business	86	26.7%	133	41.3%	103	32.0%	322	
Professional	29	21.2%	57	41.6%	51	37.2%	137	
Skilled	23	33.3%	25	36.2%	21	30.4%	69	
Unskilled	8	44.4%	6	33.3%	4	22.2%	18	
Labour	23	45.1%	17	33.3%	11	21.6%	51	

* Significant at $P \leq 0.05$

It is clearly illustrated in table 30 that, professional (37.2%) and government employed (38.4%) fathers had good level of awareness on SLD, while 50 percent of the self-employed fathers inadequate level of awareness on SLD. Moderated awareness on SLD was among the businessman fathers (41.3%). Thus, statistical analysis shows a significant association between fathers’ occupation and level of awareness on SLD. Hence, **minor hypothesis 2b (iii) is confirmed**. Fathers’ cannot be ignored as they too play an important role in supporting and guiding children.

The results of the cross tabulation carried out to associate the level of awareness on specific learning disorder and the income of the fathers is presented in table

Table 31 - Association between fathers' income and level of awareness on specific learning disorder

Annual income	Level of SLD awareness score						Total	Chi square Value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
< Rs.50000	41	39.4%	40	38.5%	23	22.1%	104	25.31**
Rs.50001 - 100000	58	32.6%	82	46.1%	38	21.3%	178	
Rs.100001 - 200000	80	29.1%	93	33.8%	102	37.1%	275	
Rs.200001- 500000	49	23.6%	80	38.5%	79	38.0%	208	
Rs.500001- 1000000	8	24.2%	14	42.4%	11	33.3%	33	

** significant $P \leq 0.01$

It is revealed that fathers with income ranging from Rs. 1,00,001 to Rs. 50,00,000 had good level of awareness on SLD, while 39.4 percent of fathers had inadequate level of awareness on SLD with annual income less than 50,000. Moderate level of awareness on SLD was among 46.6 percent of fathers with annual income between Rs. 5,00,001 – Rs. 1,00,000. Increase in the family income increases the level of awareness on SLD. Hence, **minor hypothesis 2b (iv)** there will be a significant association between father annual income and level of awareness on SLD is **confirmed**. Higher financial condition improves the standard of living, such as nutritious food, health care, playing and activity materials, better schooling, arrange tutor and excellent home environment. Higher the income of parent can provide good facilities for children, which may influence learning.

The present study supported by Melekian and Badring (1990), Stone & others (1990), Paul, Roger, John and Nancy (1990) who have concluded that lower socio-economic status predictor for learning disabilities^{251,252,253}.

The association between the level of awareness on specific learning disorder and the age of the mothers was found out using percentage analysis and the results are recorded in the table 32.

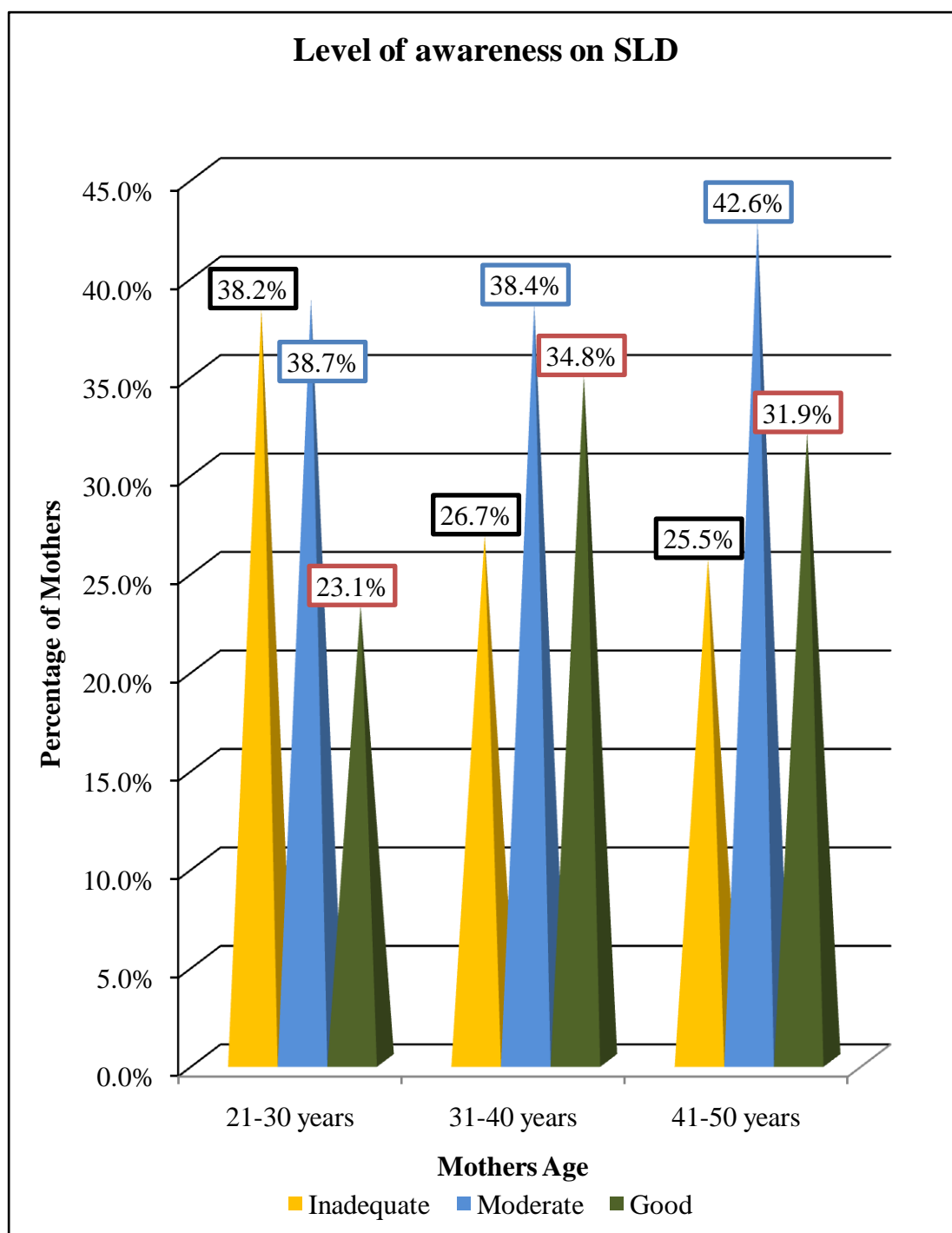
Table 32 - Association between mothers' age and level of awareness on specific learning disorder

Mother age	Level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
21-30 years	73	38.2%	74	38.7%	44	23.1%	191	12.99**
31-40 years	150	26.7%	215	38.4%	195	34.8%	560	
41-50 years	12	25.5%	20	42.6%	15	31.9%	47	

** Significant $P \leq 0.01$

The above data revealed that 34.8 percent of mothers whose ages are 31 to 40 years had good level of awareness on SLD, while 42.6 percent mothers in the ages 41 to 50 years had moderate level of awareness on SLD and 38.2 percent mothers in age group 21-30 years had inadequate level of awareness on SLD. The chi-square test value $\chi^2=12.99$ thus proves high significant association between mothers' age and level of awareness on SLD. Thus, **minor hypothesis 2c (i) is confirmed**. The results shows that middle aged mothers have better awareness on SLD when compared to younger and older mothers.

Graph 11 - Association between mothers' age and level of awareness on specific learning disorder



The results of the cross tabulation carried out to associate the level of awareness on specific learning disorder and mothers' education qualification is presented in table 33.

Table 33 - Association between mothers' education qualification and level of awareness on specific learning disorder

Mother Education Qualification	Level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
Illiterate	6	40.0%	8	53.3%	1	6.7%	15	37.27***
5 -10 std	95	37.1%	101	39.5%	60	23.4%	256	
11 -12 std	48	35.0%	52	38.0%	37	27.0%	137	
UG	58	20.8%	112	40.1%	109	39.1%	279	
PG	20	23.3%	31	36.0%	35	40.7%	86	
Diploma	8	32.0%	5	20.0%	12	48.0%	25	

*** Significant at $P \leq 0.001$

The above table clearly depict that 40 percent, 53 percent and 6.7 percent of illiterate mothers had inadequate, moderate and good level of awareness on SLD. Mother with diploma qualification of which 48percent had good, 20 percent had moderate and 32 percent had inadequate level of awareness on SLD. While mothers with PG qualification showed an increase in level of awareness on SLD from 23.3 percent to 36 percent to 40.7 percent. Showing as education improves so does the level of awareness on SLD. The chi-square test value ($\chi^2=37.27$) indicates very highly significant association between mothers' education qualification and level of awareness on SLD. Hence, **minor hypothesis 2c (ii) is confirmed.**

Children are in direct supervision of their mothers and spend more time with them. Naturally what happen if mothers' are illiterate or less educated, she cannot teach and guide her child properly. If children have any type of academic difficulty related to reading, writing, and mathematics they it will be difficult for her to offer appropriate support in academic. Hence education of the mother is important to support the child with or without disabilities.

Graph 12 - Association between mothers' education qualification and level of awareness on specific learning disorder

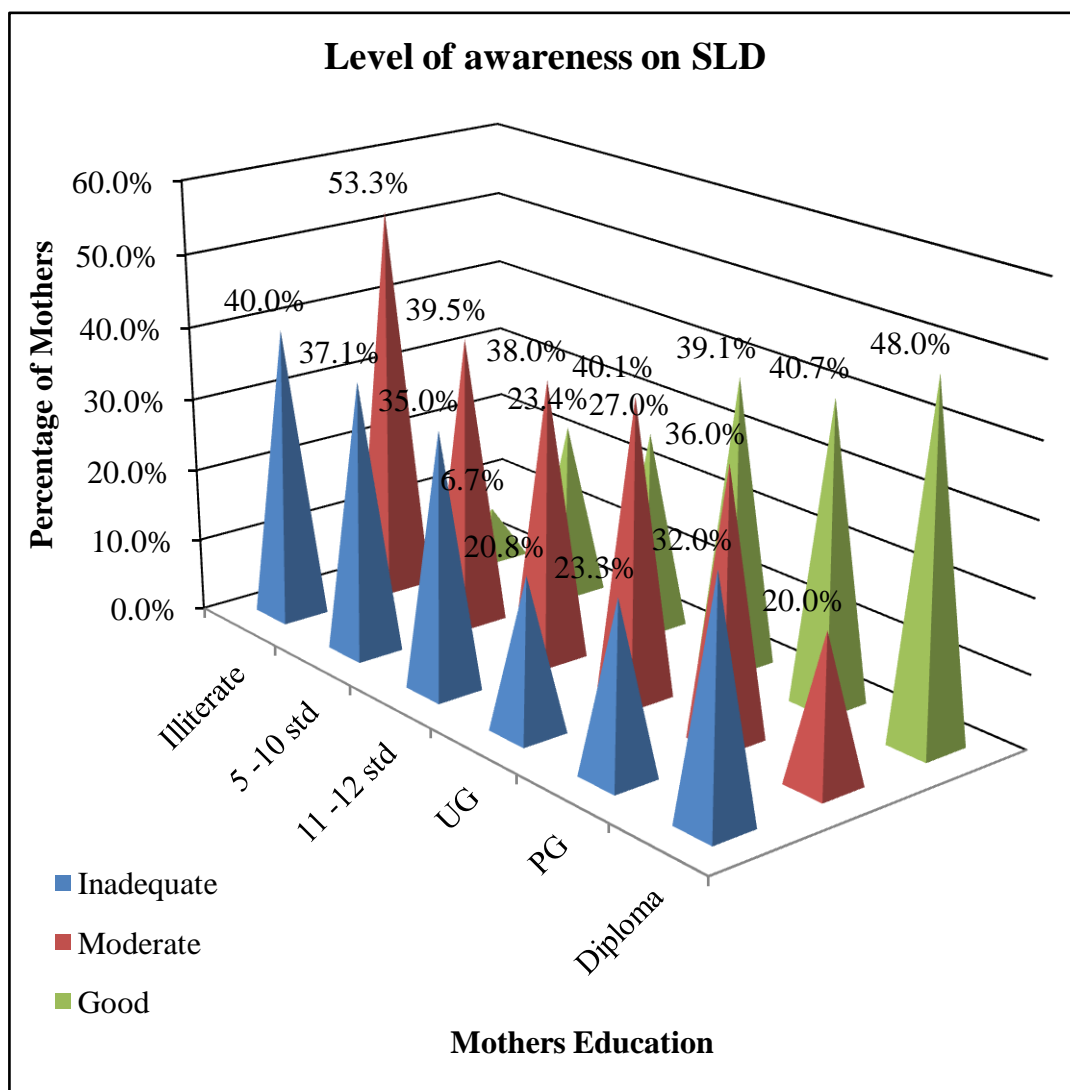


Table 34 - Association between mothers' occupation and level of awareness on specific learning disorder

Mother Occupation	Level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
Working	55	27.8%	74	37.4%	69	34.8%	198	1.12 NS
Housewife	180	30.0%	235	39.2%	185	30.8%	600	

NS – Not Significant

The above table shows that there is no association between mothers' occupation and level of awareness on SLD. The chi-square test value $\chi^2=1.12$, $p=0.56$ shows that whether mother working or at home does not have any effect on the level of awareness on SLD. The above findings lead to the interference that **minor hypothesis 2c (iii)** "There will be a significant association between mothers occupation and level of awareness on SLD" **is not confirmed**. This shows that mothers irrespective of being housewife or working professions should give time, attention and monitor their children academics more effectively.

The association between the level of specific learning disorder awareness and income of the mother was found out using chi-square analysis and the results are recorded in table.

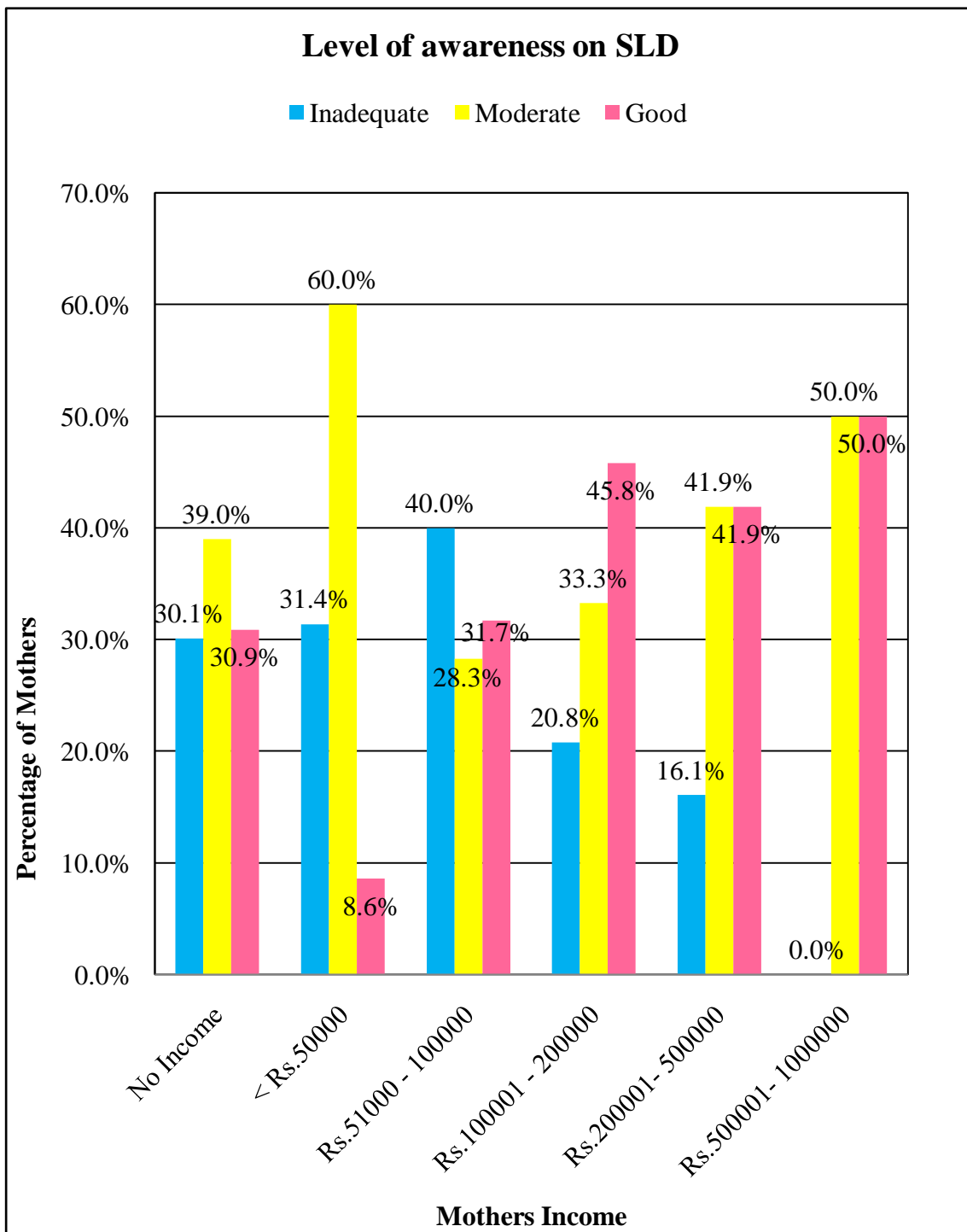
Table 35 - Association between mothers' income and level of awareness on specific learning disorder

Mother income	Level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	Percent	N	percent	N	percent		
No income	180	30.1%	233	39.0%	185	30.9%	598	24.86**
< Rs.50000	11	31.4%	21	60.0%	3	8.6%	35	
Rs.51000 - 100000	24	40.0%	17	28.3%	19	31.7%	60	
Rs.100001 - 200000	15	20.8%	24	33.3%	33	45.8%	72	
Rs.200001- 500000	5	16.1%	13	41.9%	13	41.9%	31	
Rs.500001- 1000000			1	50.0%	1	50.0%	2	

** significant $P \leq 0.01$

The above table clearly depicts that as the income increases among the mothers so does the level of awareness on SLD. Fifty percent of mothers with annual income ranging from Rs. 5,00,000/- to Rs. 10,00,000/- had good, while 31.4 percent of mothers with income less than Rs. 5,000 had inadequate level of awareness on SLD. The chi-square test value denotes a high significant association between mother income and level of awareness on SLD. Therefore, **minor hypothesis 2c (iv) is confirmed**. Hence, higher income can definitely improve the academic facilities of children.

Graph 13 - Association between mothers' income and the level of awareness on specific learning disorder



4.6. AWARENESS ON SLD AMONG TEACHERS - RESULTS AND DISCUSSION

Teachers play a vital role in identification of children with learning disorders. Students with learning disorder receive more individual attention from teachers than children without disorders.

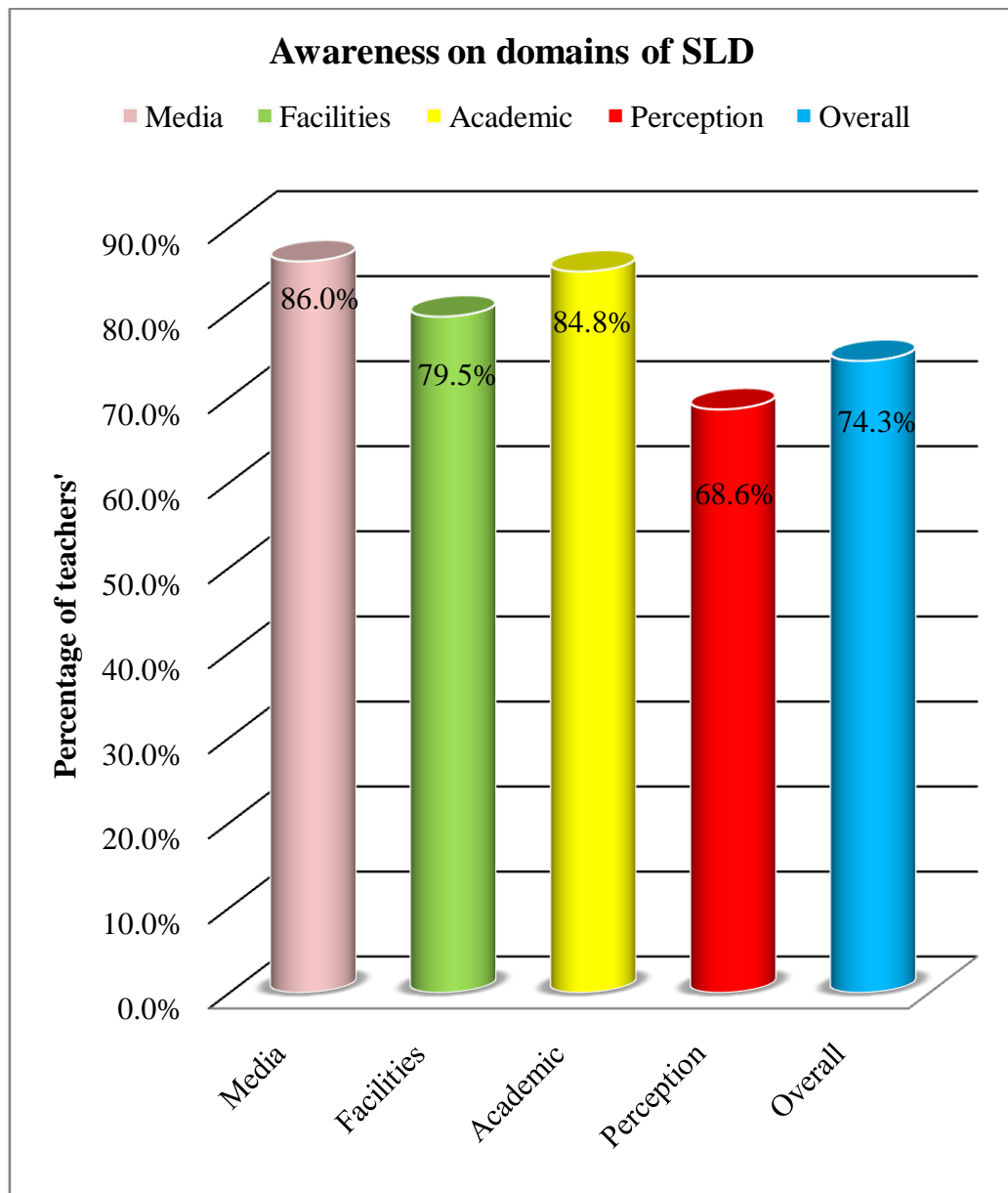
Table 36 – Mean, SD and percentage of awareness on SLD among school teachers in the domains of media, facilities, academic and perception

Domains	Awareness on SLD			
	Maximum score	Mean	SD	percent of mean score
Media	1	0.86	.35	86.0%
Facilities	2	1.59	.68	79.5%
Academic	6	5.09	.95	84.8%
Perception	15	10.29	1.65	68.6%
Total	24	17.83	2.17	74.3%

Table 36 shows the awareness on SLD among teachers under various domains such as media, facilities, Academic and perception. The mean was high 10.29 on perceptions and lowest 0.86 on media. Hence results show that teachers had better awareness on perception when compared to other domains and they perceive SLD is related to various other medical conditions. The mean total was 17.83 and the mean percentage was 74.3 percent on SLD awareness. Study by Gandhimathi and Eljo (2009) stated that only 33 percent of the primary school teachers had awareness about learning disabilities¹⁸⁹. A study from Israel performed on teachers in general and special schools showed that only 70-75 percent of teachers had appropriate

knowledge of the condition²³⁴. Studies elsewhere have also shown that it is possible for teachers to identify problems and that early identification pays^{262,263,264}.

Chart 14 - Percentage of awareness on specific learning disorder among school teachers in the domains of media, facilities, academic and perception



The 37 table depicts the mean score of 17.83 with 95 percent class interval. Hence overall 74.29 percent of the school teachers had awareness on SLD.

Table 37 - PERCENTAGE OF TEACHERS AWARENESS ON SLD

Maximum score	Mean score	Mean score with 95%CI	Percentage of mean score with 95%CI
24	17.83	17.83(17.57 -18.07)	74.29% (73.20% -75.29%)

The results of ‘t’ test carried out to find out the difference in the overall awareness on specific learning disorder among rural and urban school teachers are elucidated in the table.

Table 38 - Overall awareness on specific learning disorder among rural and urban school teachers

Place	No. of teachers	Overall awareness of specific learning disorder		Difference	‘t’ value
		Mean	SD		
Rural	100	17.38	2.25	0.67	2.53*
Urban	200	18.05	2.10		

* Significant $P \leq 0.05$

The mean is 17.38 among rural and 18.05 among the urban school with a difference of 0.67. Hence there is a significant difference on awareness of SLD between rural and urban. It was calculated using student independent t-test. This statistical difference may be due to more sources available for learning and understanding various issues children with SLD exhibit which may not be available in rural areas school. Therefore, **major hypothesis 3 is confirmed.**

The present study results contradict to the study by Gandhimathi and Eljo (2009) which states no significant association between the place (rural and urban) and the level of learning disability awareness among teachers¹⁸⁹.

Table 39 - Overall awareness on specific learning disorder among SB and CBSE school teachers

Type of Schools	No. of teachers	SLD awareness		Difference	Student independent t-test
		Mean	SD		
CBSE	100	10.08	1.97	0.52	t=2.08p=0.05*
SB	200	17.56	2.32		

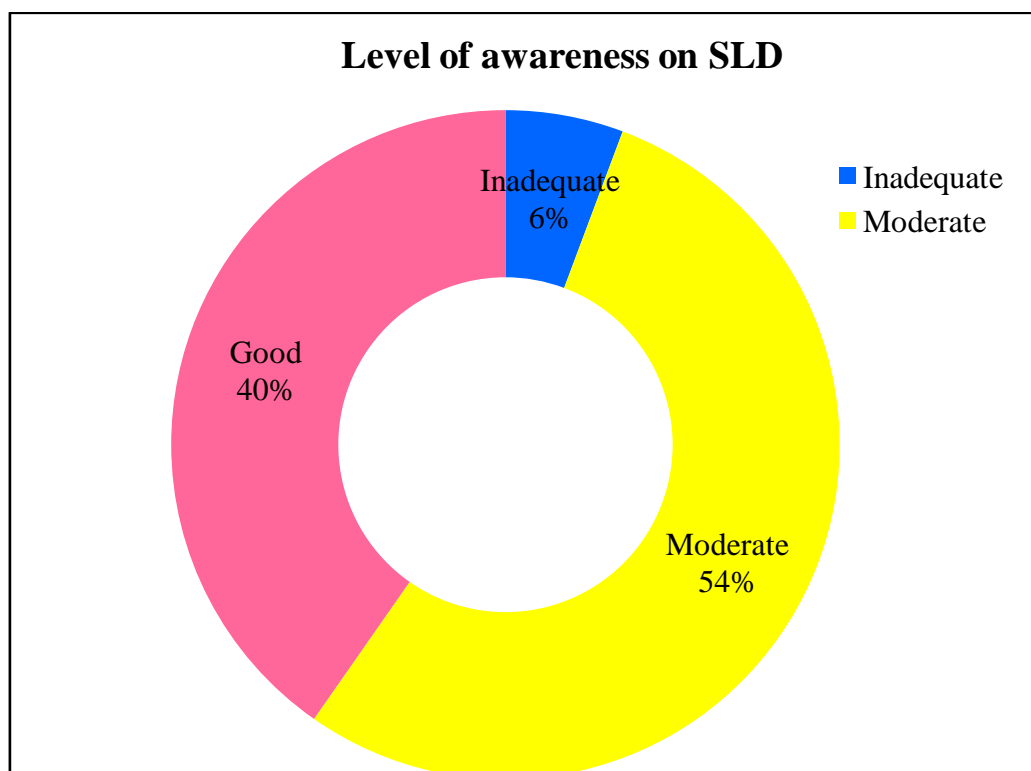
* Significant $P \leq 0.05$

There were 100 CBSE and 200 SB teachers participated in the study and from the above mean scores 10.08 (CBSE) and 17.56 (SB) it is clearly seen that there is a significant difference between awareness of SLD among State Board and CBSE schools teachers when calculated using student independent t-test. State Board teachers have better awareness of SLD than the CBSE teachers, this may be because teachers are participating in activities and workshop or they may be likely to come across more children with SLD in their classes. Therefore, **minor hypothesis 3a is accepted.**

Level of awareness on Specific Learning Disorder (SLD) among teachers

The level of awareness on SLD among teachers is presented in the following graph 15. It is clear that 54% of the teachers' had moderate level of awareness on SLD, where as 40% had good and only 6% had inadequate level of awareness on SLD.

Graph 15 – Percentage level of awareness on specific learning disorder among teachers



Teachers need to have enough knowledge or information to identify children with various issues. The present study correlates with study by Agrawal (1997) who stated that 4.3 percent of the teachers had poor knowledge while 18.1 percent, 43.5 percent, 38.3 percent had excellent, good and fair knowledge on specific learning disorder¹²⁶. The results of the present study revealed that the teacher educators who participated in this study have the average level of knowledge about the specific learning disabilities in spite of their gender and teaching experiences. The reason may be due to lack of training to teach children with special needs. The findings of the

present study reinforce the findings of the other studies claimed that the teachers have limited knowledge of Specific Learning Disabilities¹⁸¹. The Bachelor of Education (B.Ed.) training programme for teachers in India does not have any special module to identify learning disabilities in children and address them. Lack of trained personnel has consistently been one of the many obstacles to the provision of services to children with disabilities in India¹⁸¹. A study from Andhra Pradesh demonstrated that general school teachers had poorer awareness of disabilities in comparison of teachers of special schools²⁶⁶.

Teachers Age

The results of the cross tabulation carried out to find the association between teachers level of awareness on SLD and their age is presented in table 40.

Table 40 - Association between teachers' age and level of awareness on SLD

Teachers' Age	Teachers' level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
21 -30 yrs	6	8. %	46	58.9%	25	32.1%	78	13.74*
31 -40 yrs	1	0.9%	64	60.4%	41	38.7%	106	
41 -50 yrs	7	9.6%	31	42.5%	35	47.9%	73	
51 -60 yrs	3	7.0%	18	41.9%	20	46.5%	43	

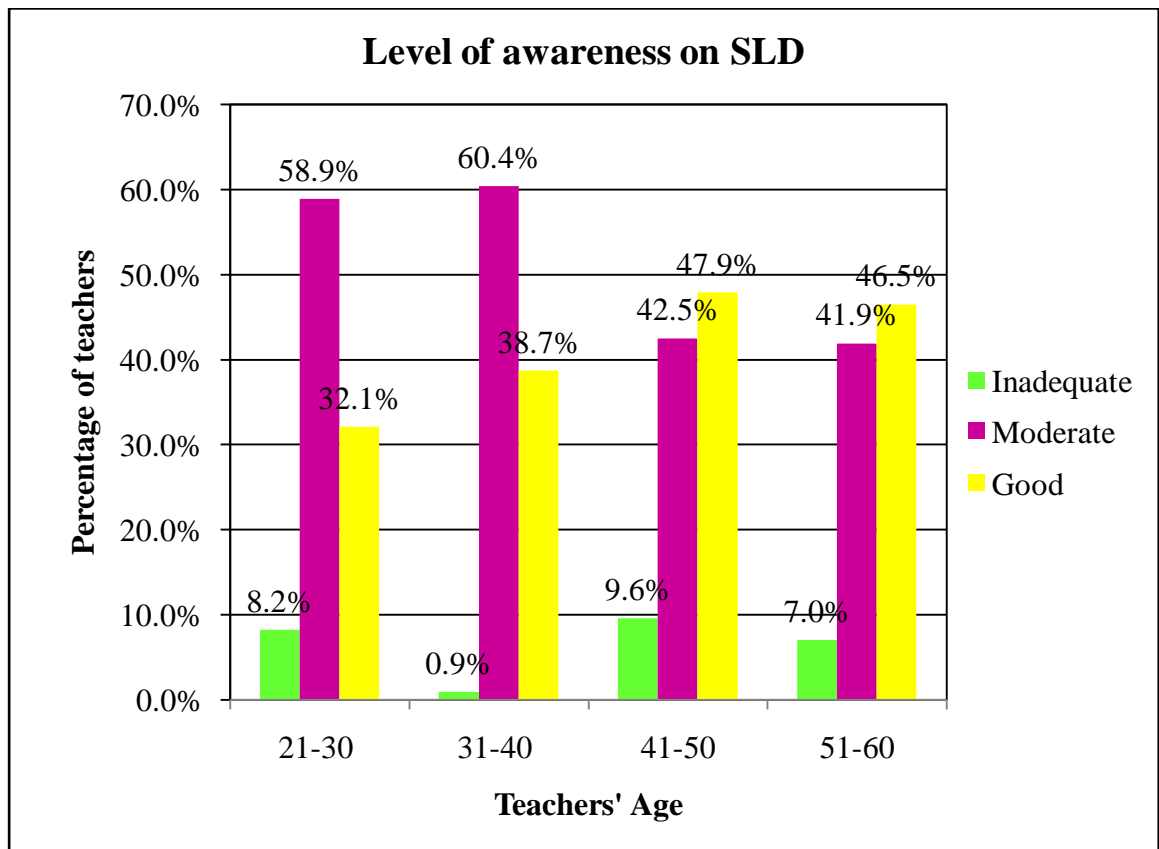
* significant at $P \leq 0.05$

It is seen from table 40 that there is significant association between teachers' age and level of awareness on SLD. 47.9 percent of the teachers in the age group 41-50 and 46.5 percent of teachers in the age group 51-60 years had good level of

awareness on SLD. While 58.9 percent of teachers in the age group 21-30 & 60.4percent of teachers in the age group 31-40 years had moderate level of awareness on SLD and very few teachers had inadequate level of awareness on SLD with less than 10 samples. The chi-square test value was $\chi^2=13.74$ with $p=0.03^*$ which denotes significant association between teachers age and level of awareness on SLD. Therefore, **minor hypothesis 3b (i) is confirmed.**

The results of the present study compile to another study results that stated age had a significant difference in the knowledge of learning disability among teachers²³², but other studies depicted no significant association between the age of the teachers and level of awareness on SLD^{193,252} and contradict to the results of the present study.

Graph 16 - Association between teachers’ age and level of awareness on SLD



Teachers Gender

Table 41 - Association between teachers' gender and level of awareness on SLD

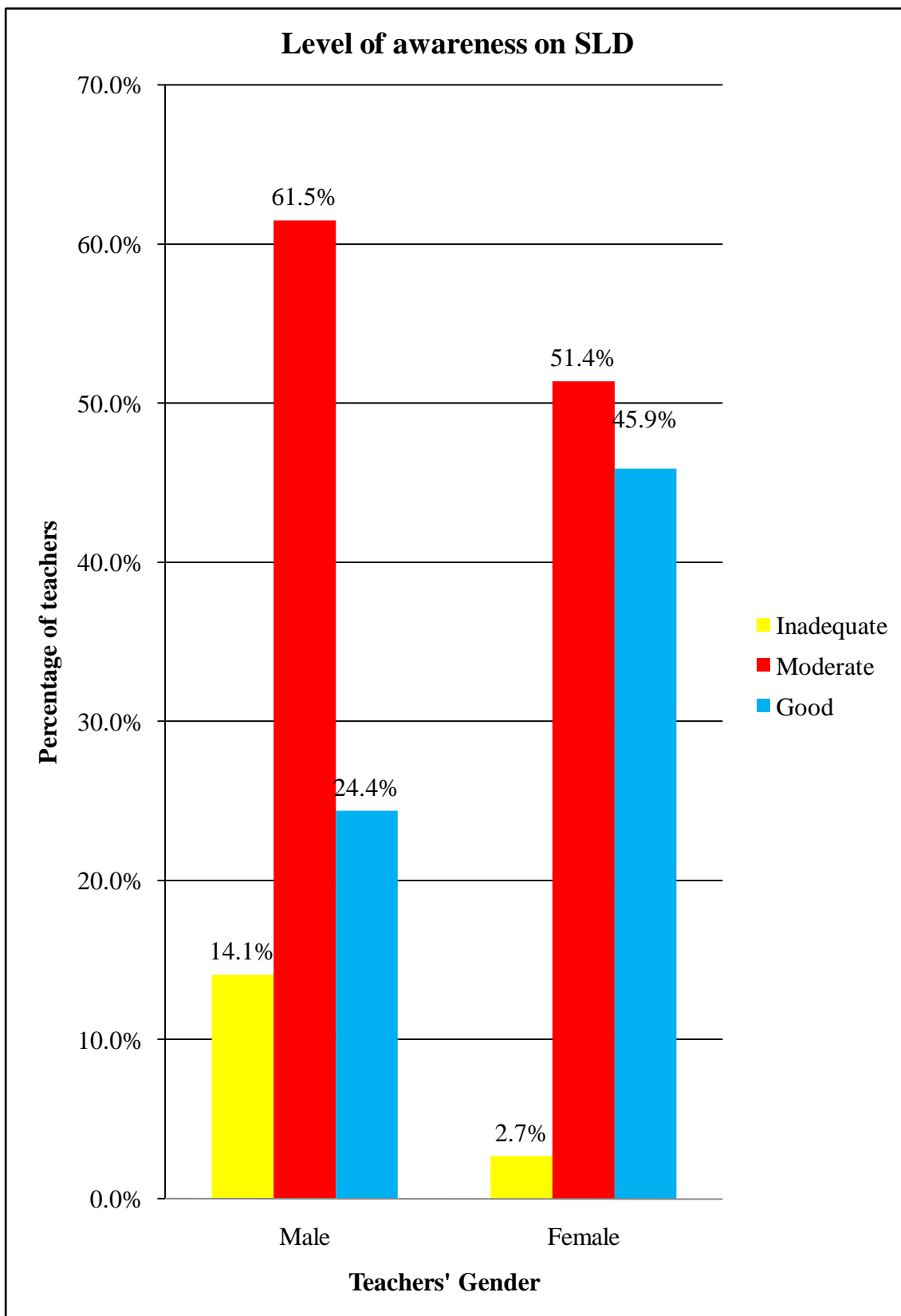
Teachers' Gender	Teachers' level of SLD awareness score						Total	Chi square test
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
Male	11	14.1%	48	61.5%	19	24.4%	78	21.01***
Female	6	2.7%	114	51.4%	102	45.9%	222	

*** Significant at $P \leq 0.001$

It is clear from the above sample that 45.9 per cent of female teachers had good level of awareness on SLD when compared to 61.5 per cent of male teachers who had moderate level of awareness on SLD. While only few teachers had inadequate level of awareness on SLD. Hence more female teachers have better level of awareness on SLD when compared to male teachers. This may be due to greater number of female teachers opting teaching profession than male. Results show that there is a very high significant association between gender and level of awareness on SLD among teachers. Hence, **minor hypothesis 3b (ii) is confirmed.**

One study depicted similar results with significant association between the gender of the teachers and level of awareness on learning disability²⁵⁴, while many studies contradicted to the present study and stated no significant association between gender and level of knowledge / awareness about specific learning disorder awareness^{187,232,252}.

Graph 17 - Association between teachers' gender and level of awareness on SLD



Type of school**Table 42 - Association between type of school and level of awareness on SLD**

Type of school	Teachers' level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
CBSE	11	7.3%	84	56.0%	55	36.7%	150	2.69 NS
SB	6	4.0%	78	52.0%	66	44.0%	150	

NS – Not Significant

Table 44 clearly depict that 44 percent of the SB and 36.7 percent of CBSE school teachers had good level of awareness on SLD. Among the sample 56 percent of CBSE and 52 percent of SB school teachers had moderate level of awareness on SLD. While inadequate level of awareness on SLD among SB and CBSE school teachers was 6 percent and 11 percent respectively. There was no difference between CBSE and SB school teachers. The statistical analysis showed that there is no association between type of schools (CBSE & SB) and level of awareness on SLD among teachers. Hence, **minor hypothesis 3b (iii) is not confirmed.**

Table 43 - Association between teachers' occupation and level of awareness on SLD

Teachers' Occupation	Teachers' level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
Principal	0	0.0%	4	50.0%	4	50.0%	8	6.09 NS
Head master	1	12.5%	5	62.5%	2	25.0%	8	
Vice principal	1	12.5%	5	62.5%	2	25.0%	8	
Teacher	15	5.4%	112	40.6%	149	54.0%	276	

NS - not significant

The data tabulated in table 43 points out that 54 percent of the teachers had good level of awareness on SLD, 50 percent of the principals had good level of awareness on SLD. The level of awareness on SLD was equally moderate among the headmasters and vice principals (62.5%). Fifty percent of the principal and 40.6 percent of the teachers had moderate level of awareness on SLD. It is also evident that 12.5 percent of the headmasters and vice-principals and meagre 5.4 percent of the teachers had inadequate level of SLD awareness. It was found statistically that no significant association existed between teacher's occupation and level of SLD awareness ($\chi^2= 6.09$). Therefore, **minor hypothesis 3b (iv) is not confirmed**. In spite of handling the administrative work in the school the head's of the school (Principal, Vice=principal and Headmasters) apart from teachers had no influence on their nature of work and awareness of SLD, as all the head also take class for upper grade students. In an unpublished study from Mumbai found that almost one third of school principals in Mumbai had no awareness of LD and half had only minimal awareness of the problem²⁶⁷.

Place of Residence

Table 44 - Association between teachers' place of residence and level of awareness on SLD

Place	Teachers' level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
Rural	10	10.0%	58	58.0%	32	32.0%	100	7.99**
Urban	7	3.5%	104	52.0%	89	44.5%	200	

** Significant at $P \leq 0.01$

It is seen from the table 44 that 44.5 percent of the urban teachers had good level of awareness on SLD with only 32 percent among rural school teachers. But teachers from both rural (58%) and urban (52%) schools had almost same percentage moderate level of awareness on SLD. Only few teachers from the sample had inadequate level of awareness on SLD (10% rural & 3.5% urban). Statistically there is a significant association between urban and rural teachers and level of awareness on SLD ($\chi^2=7.99$). Therefore, **minor hypothesis 3b (i) is confirmed**. Teachers teaching in urban school have much exposure to various training programs, short term courses and availability of more libraries. Study by Gandhimathi and Eljo (2009) contradicted to the present study and depicted no significant association between the location (rural and urban) of the teachers and their awareness on SLD¹⁸⁹.

Graph 18 - Association between teachers' place of residence and level of awareness on SLD

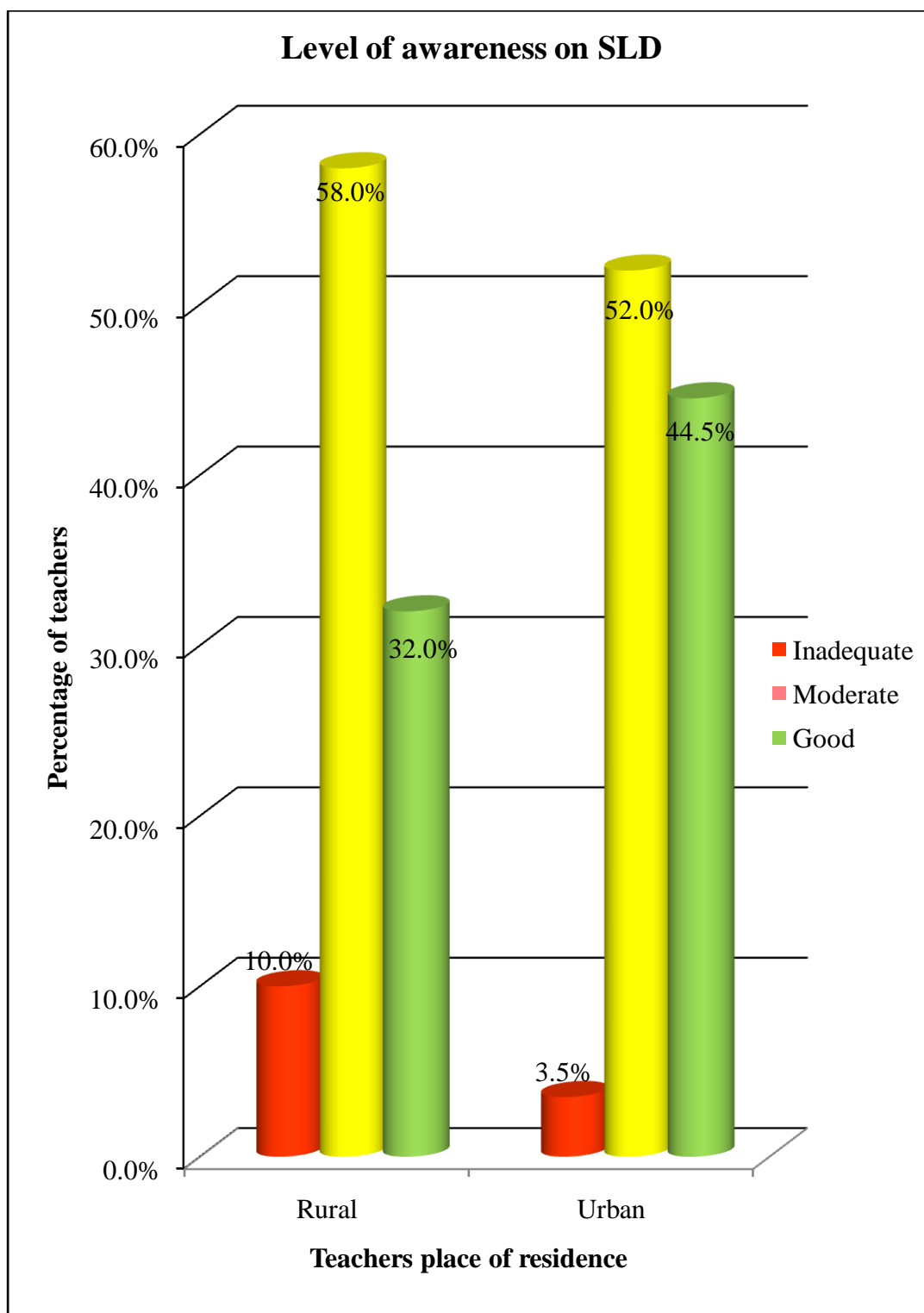


Table 45 - Association between teachers' education qualification and level of SLD awareness

Teachers' Education Qualification	Teachers' level of SLD awareness score						Total	Chi square test
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
High school	2	40.0%	1	20.0%	2	40.0%	5	$\chi^2=17.81$ $p=0.01^{**}$
UG	6	6.3%	49	51.6%	40	42.1%	95	
PG	7	3.9%	106	58.6%	68	37.6%	181	
Diploma	2	10.5%	6	31.6%	11	57.9%	19	

** Significant at $P \leq 0.01$

Among the teachers sample, 57.9 percent of the diploma qualified teachers had good level of awareness on SLD. Moderate level of awareness on SLD was to certain extends same among the under-graduate and post-graduate qualified teachers with 51.6 percent and 58.6 percent respectively. Inadequate level of awareness on SLD was low among the all qualified teachers, as the number of sample was below ten. Teacher's awareness was good among the diploma teachers as they must have more interaction and hands on session during their course. Hence, statistically there is a high significant ($p=0.01$) association was observed among teachers qualification and level of awareness on SLD. Hence, **minor hypothesis 3b (vi) is confirmed.**

Studies carried out by Moothedath and Vranda (2015) and Padhya, Goel, Das, Sarkar, et.al (2015) stated no statistical difference between education qualification of the teachers and level of SLD awareness^{252,254}.

Graph 19 - Association between teachers' education qualification and level of awareness on SLD

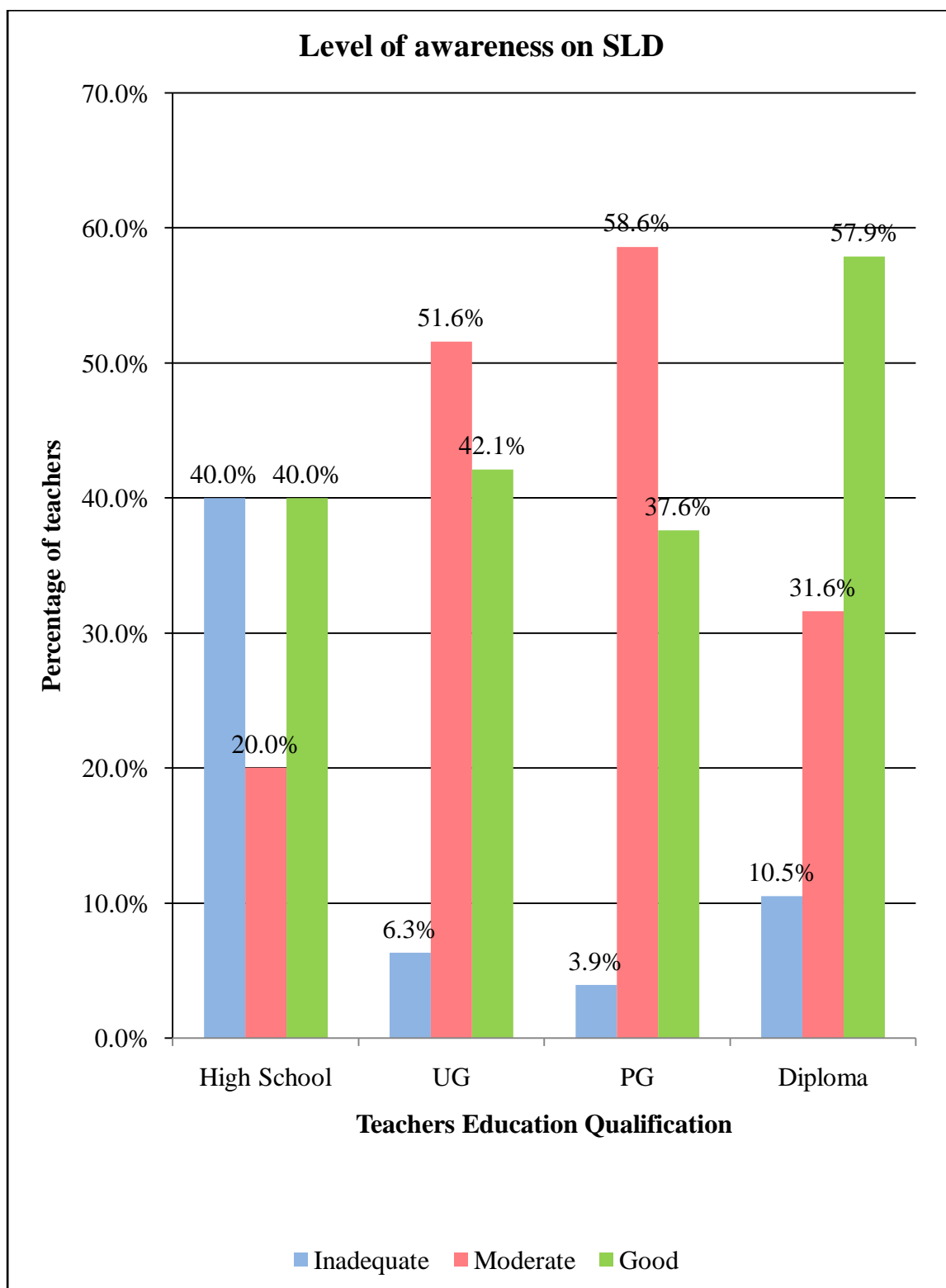


Table 46 - Association between teachers' work experience and level of awareness on SLD

Teachers Work Exp	Teachers' level of SLD awareness score						Total	Chi square test
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
< 10 years	8	4.8%	100	60.2%	60	36.0%	166	$\chi^2=15.47$ $p=0.02^*$
11 - 20 years	6	7.2%	48	57.8%	29	34.9%	83	
21 - 30 years	3	7.0%	14	32.6%	26	60.4%	43	
> 30 years	0	0.0%	2	25.0%	6	75.0%	8	

* Significant at $P \leq 0.05$

It is seen from the above table that 75 percent of the teachers with more than 30 years of teaching experience had good level of awareness on SLD, while 60.4 percent among 21-30 years experienced, with somewhat equal percentage was seen among less than 10 years (36%) and 11-20 years (34.9%) experience teachers with good level of awareness on SLD. 60.2 percent of the teachers with less than 10 years teaching experience, 57.8 percent of the teachers with 11-20 years experience, 32.6 percent of teachers with 21-30 years experience and 25 percent of the teachers with more than 30 years teaching experience had moderate level of awareness on SLD. Lower percentage score was seen among the teachers with less than 10 years to 30 years experience. As the teaching experience increases the level of SLD awareness also increases giving a positive correlation.

The statistical scores thus infer that there is a significant association between teaching experience and level of awareness on SLD. Hence, **minor hypothesis 3b (vii) is confirmed.**

The study by Moothedath and Vrandra (2015) stated that teachers with more than 20 years of teaching experience had better knowledge about specific learning disorder²⁵⁴, but the study by Kamala and Ramganes (2013); Padhya, Goel, Das, Sarkar, et.al (2015), Saravanan (2010) and Lingeswaran (2013) which depict contradictory results of the above study with no statistical difference related to teachers teaching experience and level of knowledge about specific learning disorder^{186,187,181, 252}.

Graph 20 - Association between teachers' work experience and level of awareness on SLD

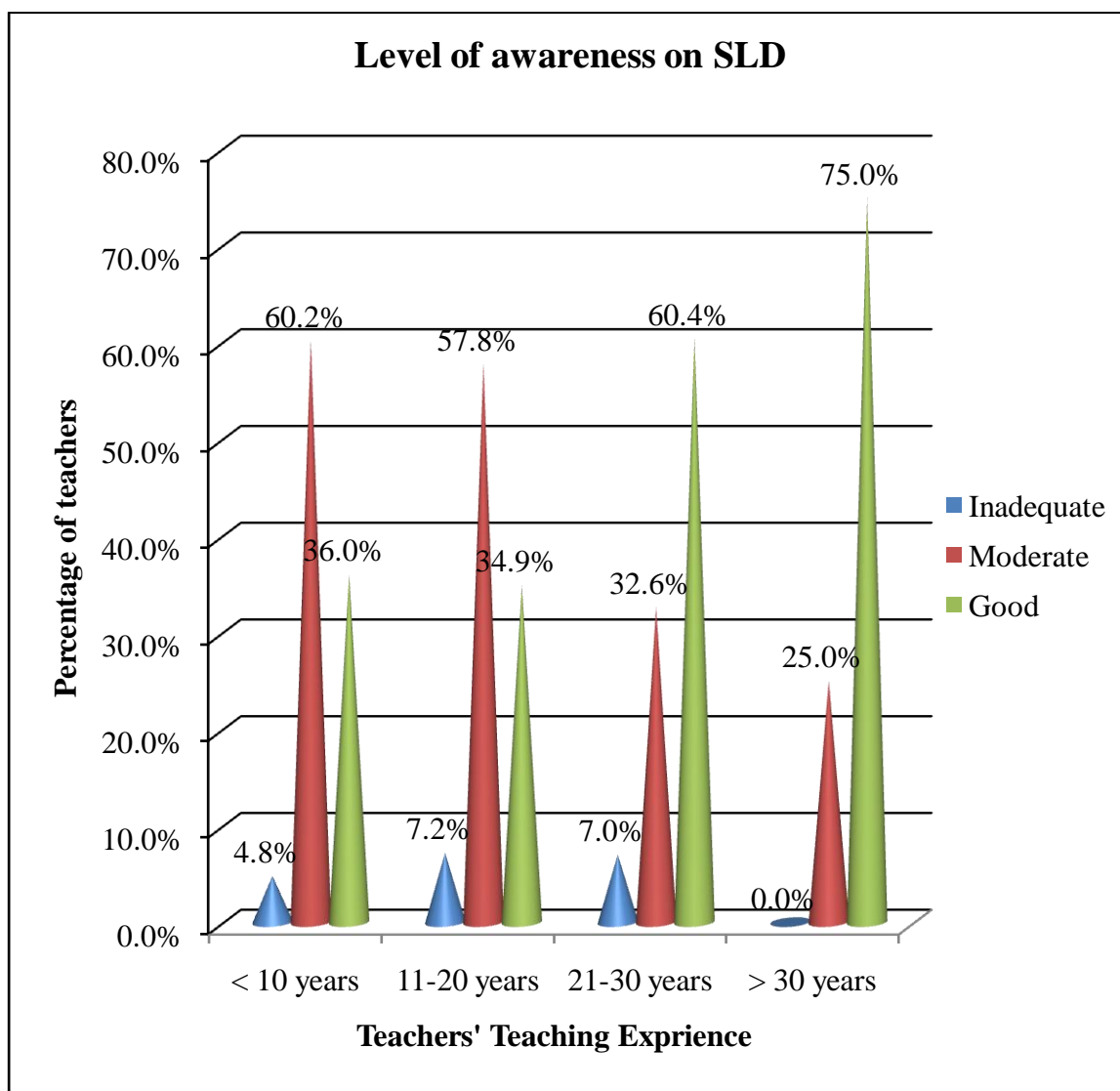


Table 47 - Association between teachers' class handling and level of awareness on SLD

Teacher's Class handling	Teachers' level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	percent		
1-5	10	7.5%	68	50.7%	56	41.8%	134	2.51 NS
6 – 10	5	3.9%	71	55.5%	52	40.6%	128	
> 10	2	5.3%	23	60.5%	13	34.2%	38	

NS-Not significant

Teachers' handling different classes and level of awareness on SLD is observed in the above table. Among the sample 41.8 per cent of primary class (1 to 5) and 40.6 percent of high school teachers (6 to 10) teachers had good level of SLD awareness. While 60.5 percent, 55.5 percent and 50.7 percent of the teachers handling class above 10, 6 to10 & 1 to 5 respectively had moderate level of awareness on SLD. A meagre percentage of teachers handling different classes had (1 to 5 - 7.5%, 6 to10 - 5.3% & above 10 - 3.9%) inadequate level of awareness on SLD. Much difference was not seen in the percentage of scores among the various groups. Hence, there is no significant association found between teachers class handling and level of awareness on SLD, as the chi-square test value $\chi^2=2.51$ and $p=0.64$. Thus, **minor hypothesis 3b (viii) is not confirmed.**

The study by Gandhimathi and Eljo (2009) depicted no statistical difference related to class teaching and knowledge about specific learning disorder. This agrees with results of the present investigation that the teachers' handling different class does not affect the level of specific learning disorder awareness¹⁸⁹.

Table 48 - Association between teachers' teaching subjects and level of awareness on SLD

Subject Teaching	Teachers' level of SLD awareness score						Total	Chi square value
	Inadequate		Moderate		Good			
	N	percent	N	percent	N	Percent		
All subjects	7	13.5%	29	55.8%	16	30.8%	52	12.00 NS
Arts	4	3.1%	71	55.9%	52	40.9%	127	
Mathematic	2	5.1%	23	59.0%	14	35.9%	39	
Science	4	5.6%	32	45.1%	35	49.3%	71	
Computer	0	0%	7	63.6%	4	36.4%	11	

NS- not significant

Among the sample, teachers teaching science and Arts had good level of awareness on SLD (49.3% & 40.4%). It is also clear that majority of the computer science teachers (63.6%) had moderate level of awareness on SLD, while 13.5% of the teachers teaching all subjects had poor level of awareness on SLD. It is observed that there is no significant association between teachers handling different subjects and level of awareness on SLD ($\chi^2=12.00$). Therefore, **minor hypothesis 3b (ix) is not confirmed.**

SUMMARY AND CONCLUSIONS

The aim of this study has necessitated the researcher to arrive at the objectives of examining the demographic and finding the prevalence of Specific Learning Disorder (SLD) among children studying in Central Board of Secondary Education (CBSE) and State Board (SB) schools in urban (Chennai) and rural (Thiruvallur). It also includes assessing the awareness of specific learning disorder among parents and teachers and association with their demographic details.

In accordance with the objectives, appropriate hypotheses were formulated. The research design adopted for this study is cross-sectional and descriptive in nature. The purpose of adapting a cross-sectional design in this study is to find the prevalence of specific learning disorder (among students) at a single point in time from a specific population. Through systematic sampling method 800 school children from class two to six, equally distributed according to the region (rural and urban), type of schools (CBSE & SB) and gender. It also assessed the awareness of SLD among parents (N=800 parents) of children assessed for SLD and 300 teachers from the selected schools.

Paper-pencil method was used to assess reading and writing skills in English, Tamil and Mathematics. The questionnaire method was adopted for parents and teachers to bring forth the awareness of SLD. The tools used were HELP CHILD Learning Difficulty (Dyslexia) Assessment Test (2005) and Specific Learning Disorder Awareness Questionnaire for parents and teachers.

The HELP CHILD Learning Difficulty (Dyslexia) Assessment Test was constructed by The Help Child, Centre for children with learning difficulty, Chennai. It assesses English, Tamil (Regional language) and Mathematics. Since 2008, this tool was officially used for the Post - Graduate Diploma in Learning Disabilities course in The Tamil Nadu Dr. M. G. R. Medical University. The tool was administered to 200 students (class 2nd to 6th with equal boys and girls) and the reliability coefficient was found to be 0.76. The Specific Learning Disorder (SLD) awareness questionnaire was constructed by the researcher to assess the SLD awareness among parents and teachers. The questionnaire consisted of 24 items with yes or no response. Initially, 45 statements were formulated with the help of experts' opinion and review of the literature. The prepared tool was administered to a sample of 200 parents and 100 teachers. The response obtained was utilized for elimination of some ambiguous questions and the final questionnaire consisted of 24 items in various domains. It assessed the knowledge, awareness and perception about SLD among parents and teachers. The questionnaire has four domains namely media, facilities, academic and perception. The reliability coefficient was 0.71 and 0.78 for teachers and parents SLD awareness questionnaire respectively.

The data was collected from students studying in Urban (Chennai) and Rural (Thiruvallur) schools following CBSE and SB pattern of the syllabus. The compiled data was statistically analysed included frequency distributions in the form one-way, two-way and multi-way tables and graphs, Chi-square, Student independent t-test, Analysis of Variance (ANOVA).

SUMMARY OF THE RESULTS

The results of the study revealed that the overall prevalence of Specific Learning Disorder (SLD) was 16.4 percent among school-going children. The prevalence of Specific Learning Disorder was 17.2 percent in rural (Thiruvallur) and 15.7 percent in urban (Chennai) school children. There is a significant difference in prevalence of SLD among urban and rural schoolchildren ($p=0.05^*$). Hence, the **first major hypothesis is confirmed.**

The prevalence rate of Specific Learning Disorder among children studying in CBSE and SB schools was 13.4 percent and 19.5 respectively. There is a very high significant difference between CBSE and SB children ($p=0.001^{***}$). Hence, **minor hypothesis 1A is confirmed.**

A comparison of the results of the gender showed that there is no significant difference in the prevalence of Specific Learning Disorder (SLD) among boy and girls studying in rural and urban schools. Hence, **minor hypothesis 1B is not confirmed.**

The results revealed that there is a very high significant difference ($p=0.001^{***}$) in the prevalence of SLD among children studying in different classes in rural and urban schools. **Hence, minor hypothesis 1C is confirmed.**

The results of the study revealed the prevalence of SLD was 22 percent in Tamil, when compared to Mathematics (14.6%) and English (12.3%). There is a significant difference in the prevalence of SLD score in English ($p=0.001^{***}$), Tamil ($p=0.02^*$)

and Mathematics ($p=0.001^{***}$) in children studying in urban and rural schools. Hence, **minor hypothesis 1Di is confirmed.**

The comparison of the results of specific learning disorder prevalence in different subjects among CBSE and SB school children showed a significant difference (English- $p=0.001^{***}$, Tamil- $p=0.001^{***}$ and Mathematics- $p=0.001^{***}$). Hence, **minor hypothesis 1Dii is confirmed.**

The comparison of the demographic results showed that there is no significant association between SLD and demographic variables of the students such as a type of school, class studying and gender of children ($p=1.00$ NS). Hence, **minor hypothesis 1E is not confirmed.**

Results of the study revealed that the overall awareness of SLD among the parents was 60.87 percent. Highly significant difference ($p=0.01^{**}$) is seen in awareness of SLD among parents of children studying in urban and rural schools. Hence, the **second major hypothesis is confirmed.**

There is a significant difference ($p=0.03^*$) seen in SLD awareness among parents of children studying in CBSE and SB school, parents of children studying in CBSE school have better SLD awareness. Hence, **minor hypothesis 2A is confirmed.**

Parents were aware of SLD on the various domains, 75 percent of the parents were very much aware of academic difficulties faced by children and 61 percent of the parents' main source of getting information related to specific learning disorder was

media (the Internet, Newspaper, Magazine, Television). Almost 57 percent of the parents had knowledge of the facilities provide for children with learning problems and perceived that SLD was related to other medical conditions. The level of SLD awareness among parents was 31.7 percent, 38.8 percent and 29.5 percent with good, moderate and inadequate respectively.

The demographic factors of the fathers showed a significant association in the level of specific learning disorder awareness (age- $p=0.02^*$, education- $p=0.001^{***}$, occupation- 0.05^* , income- 0.001^{**}). Hence, **minor hypothesis 2B is confirmed.**

The results of the association between mothers' demographic factors and level of specific learning disorder awareness (age- 0.01^{**} , education- $p=0.001^{***}$ and income- $p=0.01^{**}$), but mothers' occupation ($p=0.56$ NS) had no significant influence on the level of SLD awareness. Hence, **minor hypothesis 2C is partially confirmed.**

Among the 300 samples, 75.3 percent school teachers' had awareness on SLD. There is a significant difference between Specific Learning Disorder awareness among urban and rural school teachers ($p=0.03^*$). Hence, **the third major hypothesis is confirmed.**

There is a significant difference ($p=0.05^*$) in the awareness of SLD between CBSE and SB school teachers. State Board (SB) school teachers have better awareness on SLD. Hence, **minor hypothesis 3A is confirmed.**

The results of the study also revealed the level of SLD awareness was good (40.3%), moderate (54%) and inadequate (5.7%) among school teachers.

On the various demographic factors of the teachers' age, gender, place of residence, qualification and work experience had significant association in the awareness of SLD, while type of school, occupation, class handling, and subject teaching had no significant association. Hence, **minor hypothesis 3B is partially confirmed.**

Note: * significant at $P \leq 0.05$; ** highly significant at $P \leq 0.01$; *** very high significant at $P \leq 0.001$

CONCLUSIONS

The above results and discussion revealed that the overall prevalence of Specific Learning Disorder (SLD) was 16.4 percent among school-going children. The prevalence of SLD was 17.2 percent among rural (Thiruvallur) and 15.7 percent among urban (Chennai) school children. Children studying in State Board schools have more difficulty in English, Tamil and Mathematics when compared to Central Board of Secondary Education. Gender had no impact on the prevalence of SLD.

The overall awareness about SLD among parents was 60.87 percent, with a significant difference in the awareness of SLD among parents of children studying in urban and rural and type of schools (CBSE & SB).

Overall 75.3 percent of the teachers had awareness on SLD, with a significant difference in the awareness of SLD among urban and rural schools. The CBSE school teachers had better awareness about SLD than State Board (SB) teachers.

IMPLICATION OF THE STUDY

1. The awareness study must be done all over Tamil Nadu in both Government and Private schools.
2. Studies can focus on the influence of bilingual, multilingual in the prevalence of SLD.
3. Specific Learning Disorder (SLD) and co-morbid behavioural issues can be studied.
4. Study can also focus on the impact of smart board, computers, and other electronic education aids in academics in overcoming SLD.
5. I.Q. assessment can be done for students who are assessed for SLD and association between I.Q., academic fall and SLD can be studied.
6. Specific Learning Disorder co-morbid Attention Deficit Hyperactivity Disorder can be studied among urban and rural school children.

LIMITATIONS

Academic record was taken for school performance and SLD was assessed.

I.Q. assessment could not be done due to larger sample, hence I.Q. variables could not be compared with academic backwardness and SLD.

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APPENDICES

APPENDIX – I

PROFORMA – English and Tamil Version

(Parents please fill in all the details) Child's and Parents' profile

Name of the child : _____ Class: _____
 Date of birth : _____ age: _____ Sex: Male / Female
 School name: _____ Medium: English

Family details

Father's name: _____ Age: _____
 Education: _____ Occupation: _____ Income: _____ (annual)
Mother's name: _____ Age: _____
 Education: _____ Occupation: _____ Income: _____ (annual)
 Address for Communication: _____
 Phone Number: Mobile number: _____ Res: _____
 e-mail : _____
 Marriage: Related / unrelated marriage: _____

Any stress during Pregnancy: yes / no (if yes, give details) _____

Information on siblings

Order of birth	Brother /sister	Age	Sex	Any illness	Similar learning / behavior problems	Other details

குழந்தையின் விவரங்கள்

(தயவு செய்து முழுமையாக நிரப்பவும்)

குழந்தையை விவரங்கள்

குழந்தைபெயர்: _____ வகுப்பு: _____
 பிறந்த நாள் / மாதம் / வருடம் : _____ வயது: _____ பாலினம்: ஆண் / பெண்
 பள்ளியின் பெயர்: _____ கற்கும் வழி : ஆங்கிலம்

குடும்ப விவரம்:

அப்பாவின் பெயர்: _____ வயது: _____
 படிப்புத் தகுதி: _____ வேலை: _____ ஆண்டு வருமானம்: _____
 அம்மாவின் பெயர்: _____ வயது: _____
 படிப்புத் தகுதி: _____ வேலை: _____ ஆண்டு வருமானம்: _____
 தொடர்பு கொள்ள வேண்டிய முகவரி: _____
 தொலை பேசி எண் : அலுவலகம்: _____ வீடு: _____

திருமணம் : உறவுகளிடையே / உறவு அல்லாத

கர்ப்பமாக இருக்கும் போது மனஅழுத்தம்: இருந்தது / இல்லை

(இருந்தது என்றால் விவரம் எழுதவும்) _____

உடன் பிறப்புகள் பற்றிய குறிப்புகள்:

பிறப்பு வரிசை	சகோதரர்/ சகோதரி	வயது	பாலினம்	உடல்நலக் குறைவு	கற்றலின் குறைபாடு நடத்தையில் பிரச்சனைகள்	மற்ற விவரங்கள்

APPENDIX – II

LEARNING DIFFICULTY PARENTS AWARENESS QUESTIONNAIRE – English
Version

Sl.no.	These are questions, which describe about Dyslexia/Learning Difficulty in students. Please read the questions carefully and tick the appropriate box ‘ YES ’ or ‘ NO ’. Please do not leave any question without answering. Your response will be totally confidential.		
1	Do you know about Dyslexia/ Learning Difficulty?	Yes	No
2.	If yes, by what source did you come to know about Dyslexia/ Learning Difficulty- a) News Paper b) Magazine c) Radio d) Television e) Seminar f) Internet g) Others – Specify	Yes	No
3.	Dyslexia/ Learning Difficulty is a disease/ disorder? Specify	Yes	No
4.	Dyslexia/ Learning Difficulty can be identified by fall in school/ academic performance.	Yes	No
5.	Dyslexia/ Learning Difficulty is a neurological condition.	Yes	No
6.	Dyslexia/ Learning Difficulty children are bright in all –except studies.	Yes	No
7.	Dyslexia/ Learning Difficulty will become alright as the child grows.	Yes	No
8.	Dyslexia/ Learning Difficulty is a genetic problem.	Yes	No
9.	Dyslexia/ Learning Difficulty children cannot study in normal school.	Yes	No
10.	Dyslexia/ Learning Difficulty children need special coaching.	Yes	No
11.	By remedial coaching Dyslexic/ Learning Disability children can overcome the Learning Difficulty.	Yes	No
12.	Dyslexia/ Learning Difficulty children have difficulty in completing the home work.	Yes	No
13.	Dyslexia/ Learning Difficulty children have difficulty in concentration.	Yes	No
14.	Dyslexia/ Learning Difficulty children avoid study situations, by saying “I want to drink water, go to toilet, hand is paining”, etc.	Yes	No
15.	Dyslexia/ Learning Difficulty children are difficult to handle in class.	Yes	No
16.	Dyslexia/ Learning Difficulty children have difficulty in copying from black board.	Yes	No
17.	Dyslexia/ Learning Difficulty children can do better with individual supervision.	Yes	No
18.	Dyslexia/ Learning Difficulty students will be benefitted by kind and firm individual attention.	Yes	No
19.	Dyslexia/ Learning Difficulty children need separate classes	Yes	No
20.	Do you know facilities given by the State Government/ CBSE board such as extra time, allowance for spelling, use of calculator, exemption of second language, etc, are useful to children with Dyslexia / Learning Difficulty?	Yes	No
21.	To give alternate subjects like fine arts, drawing, music for second language will be useful for Dyslexia/ Learning Difficulty children.	Yes	No
22.	Dyslexia/ Learning Difficulty children do orally better than writing.	Yes	No
23.	Dyslexia/ Learning Difficulty children have more difficulty in language (Hindi / Tamil) than in English	Yes	No
24.	The child frequently refuses to attend school by complaining stomach pain, vomiting, headache etc may be related to Learning Difficulty?	Yes	No

கற்ற- ன் குறைபாடு பெற்றோர் விழிப்புணர்வு வினாத்தொகுப்பு
Parents Awareness Questionnaire – Tamil Version

Sl. no.	குழந்தைகளிடம் காணப்படும் கற்ற- ன் குறைபாடு பற்றிய விவரங்கள் தொகுத்து கொடுக்கப்பட்டுள்ளது அவை ஒவ்வொன்றையும் நீங்கள் தயவு செய்து படித்து 'ஆம்' 'இல்லை' என பதில் அளிக்கவும். எந்த கேள்வியையும் பதில் அளிக்காமல் விட்டு விடாதீர்கள். உங்களுடைய கருத்துக்கள் ரகசியமாக பாதுகாக்கப்படும்.		
1	கற்ற- ன் குறைபாடு பற்றி உங்களுக்கு தெரியுமா?	ஆம்	இல்லை
2.	தெரிந்திருக்குமேயானால் எதன் மூலமாக என்பதை குறிப்பிடவும் - 1) செய்தித்தாள் 2) பத்திரிக்கைகள் 3) வானொ- 4) தொலைக்காட்சி 5) கருத்தரங்கம் 6) இணையதளம் 7) வேறு வகையில்	ஆம்	இல்லை
3.	கற்ற- ன் குறைபாடு ஒரு நோயா / குறைபாடா ? குறிப்பிடவும்	ஆம்	இல்லை
4.	கற்ற- ன் குறைபாட்டை பள்ளி மதிப்பெண்களில் திடீர் சரிவு ஏற்படுவதினால் கண்டறிய முடியும் ?	ஆம்	இல்லை
5.	கற்ற- ன் குறைபாடு நரம்பு சம்பந்தமான குறைபாடா ?	ஆம்	இல்லை
6.	படிப்பைத்தவிர மற்ற எல்லா செயல்களிலும் சிறப்பாக செயல்படுகிறார்களா?	ஆம்	இல்லை
7.	குழந்தை வளர வளர நாளடைவில் இக்குறைபாடு சரியாகி விடுமா ?	ஆம்	இல்லை
8.	இக்குறைபாடு பரம்பரையாக வருவதா?	ஆம்	இல்லை
9.	இக்குழந்தைகள் அனைவரும் படிக்கும் பள்ளியில் படிக்கமுடியாது.	ஆம்	இல்லை
10.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு சிறப்புப்பயிற்சி தேவைப்படுகிறது.	ஆம்	இல்லை
11.	சிறப்புப்பயிற்சியினால் கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் இக்குறைபாட்டை நிவர்த்தி செய்து கொள்ள முடியும்.	ஆம்	இல்லை
12.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் வீட்டு பாடங்கள் செய்வதில் சிரமப்படுகிறார்களா?	ஆம்	இல்லை
13.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் படிப்பில் கவனம் செய்வதில் சிரமம் இருக்கும்.	ஆம்	இல்லை
14.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் படிக்கும் சூழலை தவிர்ப்பார்கள் “தண்ணீர்குடிக்கிறேன், பாத்திரம்போகிறேன், கைவ- க்கிறது போன்ற காரணங்களை கூறுவார்கள்”	ஆம்	இல்லை
15.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளை வகுப்பறையில் கையாள்வதில் சிரமம்.	ஆம்	இல்லை
16.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் கரும்பலகையி- ருந்து (Black board) பார்த்து எழுதுவதில் சிரமம்.	ஆம்	இல்லை
17.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு தனிக்கவனம் செலுத்தும் பொழுது சிறப்பாக செயல்படுகிறார்கள்.	ஆம்	இல்லை
18.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு அன்பான, சுண்டிப்பான தனிக்கவனம் நன்மை தரும்.	ஆம்	இல்லை
19.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு தனி வகுப்பறைகள் தேவை.	ஆம்	இல்லை
20.	அரசின் தனி சலுகைகளாக தேர்வு எழுத அதிக நேரம், எழுத்துப்பிழை அனுமதித்தல், கால்குலேட்டரை பயன்படுத்தல், இரண்டாவது மொழியி- ருந்து விலக்கு போன்றவை உதவி செய்கின்றன.	ஆம்	இல்லை
21.	ஓவியம், பாடல் போன்ற பிறகலைகளை மொழிக்குப் பதிலாக கற்றுத்தருதல் பலன்தரும்.	ஆம்	இல்லை
22.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு எழுதுவதைவிட சொல்வதில் திறமையாக செய்வார்கள்	ஆம்	இல்லை
23.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு ஆங்கில மொழி கற்பனை விட தமிழ், இந்தி படிப்பதில் அதிக சிரமம் இருக்கும்	ஆம்	இல்லை
24.	குழந்தைகள் அடிக்கடி வயிற்று வ- , வாந்தி, போன்ற காரணங்களை சொல்- க்கொண்டு பள்ளிக்குச் செல்ல மறுப்பதும் கற்ற- ன் குறைபாடு இருப்பது ஒரு காரணம் என்று கருதுகிறீர்களா?	ஆம்	இல்லை

APPENDIX – III

LEARNING DIFFICULTY TEACHERS AWARENESS QUESTIONNAIRE – English

Version

Please fill the details below:

Name : _____ Age: _____ Occupation: _____
 Qualification: _____ Work Experience: _____ Years Class handling: _____
 Subject: _____ Phone #: _____ School: _____

Sl. no.	These are questions, which describe Dyslexia/Learning Difficulty in students. Please read the questions carefully and tick the appropriate box ' YES ' or ' NO '. Please do not leave any question without answering. Your responses will be totally confidential.		
1	Do you know about Dyslexia/ Learning Difficulty?	Yes	No
2.	If yes, by what source did you come to know about Dyslexia/ Learning Difficulty- a) News Paper b) Magazine c) Radio d) Television e) Seminar f) Internet g) Others – Specify	Yes	No
3.	Dyslexia/ Learning Difficulty is a disease/ disorder? Specify	Yes	No
4.	Dyslexia/ Learning Difficulty can be identified by fall in school/ academic performance.	Yes	No
5.	Dyslexia/ Learning Difficulty is a neurological condition.	Yes	No
6.	Dyslexia/ Learning Difficulty children are bright in all –except studies.	Yes	No
7.	Dyslexia/ Learning Difficulty will become alright as the child grows.	Yes	No
8.	Dyslexia/ Learning Difficulty is a genetic problem.	Yes	No
9.	Dyslexia/ Learning Difficulty children cannot study in normal school.	Yes	No
10.	Dyslexia/ Learning Difficulty children need special coaching.	Yes	No
11.	By remedial coaching Dyslexic/ Learning Difficulty children can overcome the Learning Difficulty.	Yes	No
12.	Dyslexia/ Learning Difficulty children have difficulty in completing the home work.	Yes	No
13.	Dyslexia/ Learning Difficulty children have difficulty in concentration.	Yes	No
14.	Dyslexia/ Learning Difficulty children avoid study situations, by saying 'I want to drink water, go to toilet, hand is paining', etc.	Yes	No
15.	Dyslexia/ Learning Difficulty children are difficult to handle in class.	Yes	No
16.	Dyslexia/ Learning Difficulty children have difficulty in copying from black board.	Yes	No
17.	Dyslexia/ Learning Difficulty children can do better with individual supervision.	Yes	No
18.	Dyslexia/ Learning Difficulty students will be benefitted by kind and firm individual attention.	Yes	No
19.	Dyslexia/ Learning Difficulty children need separate classes	Yes	No
20.	The facilities by the Government/ CBSE board such as extra time, allowance for spelling, use of calculator, exemption of second language, etc are useful to children with Learning Difficulty.	Yes	No
21.	To give alternate subjects like fine arts, drawing, music for second language will be useful for Dyslexia/ Learning Difficulty children.	Yes	No
22.	Dyslexia/ Learning Difficulty children do orally better than writing	Yes	No
23.	Dyslexia/ Learning Difficulty children have more difficulty in language (Hindi / Tamil) than in English	Yes	No
24.	The child's frequently refuses to attend school by complaining stomach pain, vomiting, headache etc may be related to Learning Difficulty?	Yes	No

**கற்ற- ன் குறைபாட்டினை அறிய ஆசிரியர்களின் கருத்து ஆய்வு தொகுப்பு -
Tamil Version**

தயவு செய்து பூர்த்திசெய்யவும்

பெயர்: _____ வயது: _____ வேலை: _____ படிப்புத் தகுதி: _____

பணியில் அனுபவம் : _____ (ஆண்டு) கையாளும் வகுப்பு: _____ பள்ளியின் பெயர்: _____

Sl. no.	குழந்தைகளிடம் காணப்படும் கற்ற- ன் குறைபாடு பற்றிய விவரங்கள் தொகுத்து கொடுக்கப்பட்டுள்ளது அவை ஒவ்வொன்றையும் நீங்கள் தயவு செய்து படித்து 'ஆம்' 'இல்லை' என பதில் அளிக்கவும். எந்த கேள்வியையும் பதில் அளிக்காமல் விட்டு விடாதீர்கள். உங்களுடைய கருத்துக்கள் ரகசியமாக பாதுகாக்கப்படும்.		
1	கற்ற- ன் குறைபாடு பற்றி உங்களுக்கு தெரியுமா?	ஆம்	இல்லை
2.	தெரிந்திருக்குமேயானால் எதன் மூலமாக என்பதை குறிப்பிடவும்-1) செய்தித்தாள் 2) பத்திரிக்கைகள் 3) வானொ- 4) தொலைக்காட்சி 5) கருத்தரங்கம் 6) இணையதளம் 7) வேறு வகையில்	ஆம்	இல்லை
3.	கற்ற- ன் குறைபாடு ஒரு நோயா / குறைபாடா ? குறிப்பிடவும்	ஆம்	இல்லை
4.	கற்ற- ன் குறைபாட்டை பள்ளி மதிப்பெண்களில் திடீர் சரிவு ஏற்படுவதினால் கண்டறிய முடியும் ?	ஆம்	இல்லை
5.	கற்ற- ன் குறைபாடு நரம்பு சம்பந்தமான குறைபாடா ?	ஆம்	இல்லை
6.	படிப்பைத்தவிர மற்ற எல்லா செயல்களிலும் சிறப்பாக செயல்படுகிறார்களா?	ஆம்	இல்லை
7.	குழந்தை வளர வளர நாளடைவில் இக்குறைபாடு சரியாகி விடுமா ?	ஆம்	இல்லை
8.	இக்குறைபாடு பரம்பரையாக வருவதா?	ஆம்	இல்லை
9.	இக்குழந்தைகள் அனைவரும் படிக்கும் பள்ளியில் படிக்கமுடியாது.	ஆம்	இல்லை
10.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு சிறப்புப்பயிற்சி தேவைப்படுகிறது.	ஆம்	இல்லை
11.	சிறப்புப்பயிற்சியினால் கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் இக்குறைபாட்டை நிவர்த்தி செய்து கொள்ள முடியும்.	ஆம்	இல்லை
12.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் வீட்டு பாடங்கள் செய்வதில் சிரமப்படுகிறார்களா?	ஆம்	இல்லை
13.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் படிப்பில் சுவனம் செய்வதில் சிரமம் இருக்கும்.	ஆம்	இல்லை
14.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் படிக்கும் சூழலை தவிர்ப்பார்கள் "தண்ணீர் குடிக்கிறேன், பாத்ரூம்போகிறேன், கைவ- க்கிறது போன்ற காரணங்களை கூறுவார்கள்"	ஆம்	இல்லை
15.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளை வகுப்பறையில் கையாள்வதில் சிரமம்.	ஆம்	இல்லை
16.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகள் கரும்பலகையி- ருந்து (Black board) பார்த்து எழுதுவதில் சிரமம்.	ஆம்	இல்லை
17.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு தனிக்கவனம் செலுத்தும் பொழுது சிறப்பாக செயல்படுகிறார்கள்.	ஆம்	இல்லை
18.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு அன்பான, கண்டிப்பான தனிக்கவனம் நன்மை தரும்.	ஆம்	இல்லை
19.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு தனி வகுப்பறைகள் தேவை.	ஆம்	இல்லை
20.	அரசின் தனி சலுகைகளாக தேர்வு எழுத அதிக நேரம், எழுத்துப்பிழை அனுமதித்தல், கால்குலேட்டரை பயன்படுத்தல், இரண்டாவது மொழியி- ருந்து விலக்கு போன்றவை உதவி செய்கின்றன.	ஆம்	இல்லை
21.	ஓவியம், பாடல் போன்ற பிறகலைகளை மொழிக்குப் பதிலாக கற்றுத்தருதல் பலன்தரும்.	ஆம்	இல்லை
22.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு எழுதுவதைவிட சொல்வதில் திறமையாக செய்வார்கள்	ஆம்	இல்லை
23.	கற்ற- ன் குறைபாடு உள்ள குழந்தைகளுக்கு ஆங்கில மொழி கற்பனை விட தமிழ், இந்தி படிப்பதில் அதிக சிரமம் இருக்கும்	ஆம்	இல்லை
24.	குழந்தைகள் அடிக்கடி வயிற்று வ- , வாந்தி, போன்ற காரணங்களை சொல்- க்கொண்டு பள்ளிக்குச் செல்ல மறுப்பதும் கற்ற- ன் குறைபாடு இருப்பது ஒரு காரணம் என்று கருதுகிறீர்களா?	ஆம்	இல்லை

APPENDIX – IV**STUDENT ASSESSMENT SHEET**Name / பெயர்: _____ Class / வகுப்பு: II Sec / பிரிவு: ____ Date / தேதி: __/__/20

School Name / பள்ளியின் பெயர்: _____ District / மாவட்டம்: _____

ENGLISH

Write capital letters A-Z / A-Z எழுதவும் ____ / 26

Write Small letters a-z / a-z எழுதவும் ____ / 26

ENGLISH - Dictation Words / ஆங்கிலம் சொல்வதை எழுதவும் (சொற்கள்) __/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

ENGLISH - Sentence Dictation / ஆங்கிலம் சொல்வதை எழுதவும் (வாக்கியம்) __/10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

ENGLISH - CLASS II

Sequence Oral: ____/26 Reading Letters: Caps ____/26; Small ____/ 26

READING WORDS

____ / 15

Sl. no	Words	Read as	Add	Omit	Subs / Int	M/W	b-d/ Inv	Phoneme	Mis pro	L/Id
1	Bag									
2	Hen									
3	Wig									
4	Dot									
5	Cup									
6	Kite									
7	Door									
8	Ship									
9	Bird									
10	Thin									
11	Grass									
12	Clock									
13	Swing									
14	Stone									
15	Small									
16	Pencil									
17	Brother									
18	Garden									
19	Kitchen									
20	Picture									

READING SENTENCES

_____ / 10

1. This is my house.
2. These are our books.
3. Fish lives in the water.
4. Goat eats grass.
5. We see with our eyes.
6. My grandfather is very old.
7. Driver drives the bus.
8. The Sun rises in the East.
9. I will eat fruits and vegetables.
10. I play in the garden with my pet dog.

TAMIL

Class II / II வகுப்பு

Write Tamil letters அ - ஃ / அ - ஃ எழுதவும்

___ / 13

Write Tamil letters க- கௌ/ க- கௌ எழுதவும்

___ / 12

Write Tamil letters க் - ன் / க் - ன் எழுதவும்

___ / 18

TAMIL - Dictation words / தமிழில் சொல்வதை எழுதவும் (சொற்கள்)

___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

TAMIL - Sentence Dictation / தமிழில் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

TAMIL – READING Class II / II வருப்பு

Sequence Oral: அ - ஃ ____/ 13; க- கௌ ____/12; க் - ன் ____/18

Reading Letters: அ - ஃ ____/ 13; க- கௌ ____/12; க் - ன் ____/18

WORDS

____/ 15

Sl. No.	WORDS	Read as	Add	Omit	Subs/ Int	M/r	Phoneme	L/Id
1	அணில்							
2	ஆலமரம்							
3	கப்பல்							
4	இலை							
5	காகம்							
6	கிளி							
7	கீப்பு							
8	குரங்கு							
9	பூண்டு							
10	தென்னை							
11	மேற்கு							
12	மாதம்							
13	பொங்கல்							
14	நிறம்							
15	கொட்டை							
16	சோம்பு							
17	காற்று							
18	வெளவால்							
19	வண்டி							
20	வாழைப்பூ							

SENTENCES

____/10

1. அறம் செய விரும்பு.
2. எங்கள் பள்ளி நல்ல பள்ளி.
3. அம்மா மிகவும் நல்லவர்.
4. மாலையில் சிறிது நேரம் விளையாடு.
5. எங்கள் குடும்பம் சிறிய குடும்பம்.
6. நாய் வீட்டை காக்கும்.
7. யானை கரும்பைத் தின்னும்.
8. கொக்கு வெள்ளை நிறம்.
9. நாம் கால்களால் நடக்கிறோம்.
10. வாரத்தின் நாட்கள் ஏழு.

ARITHMETIC / கணக்கு

Class: II / II வகுப்பு

SEQUENCE ORAL: 20 to 1 _____/20; 1 to 20 ____/20

READING NUMBERS – 1-20: _____/ 20

Write number 1 to 20 / 1 - 20 எழுதவும்

_____/ 20

Write 50 -31 / 50 - 31 எழுதவும்

_____/ 20

What comes before and after? முன் - பின் எண்களை

எழுதவும் ____/ 10

_____, 90, _____. _____, 263, _____.
 _____, 37, _____. _____, 30, _____. _____, 100, _____.

Fill in with equal (=) greater (>) or lesser (<) signs / விடுப்பட்ட இடத்தில் > < = சரியானதை நிரப்பவும்

74 _____ 84 63 _____ 39 ____ / 6
 32 _____ 32 99 _____ 100
 113 _____ 130 21 _____ 21

Write the number names / எழுத்தில் எழுதவும்

____/ 5

11 - _____
 25 - _____
 44 - _____
 133 - _____
 199 - _____

Write the numerals / எண்களில் எழுதவும்

____/ 5

Seventeen - _____
 Eighty-three - _____
 One hundred and six - _____
 One hundred and fifty - _____
 One hundred and twelve - _____

Addition / கூட்டல்

___ / 5

2	4 5	3 7	1 8 5	7 7 7
<u>+ 6</u>	<u>+ 4</u>	<u>+ 4</u>	<u>+ 5 0 6</u>	<u>+ 1 8 3</u>
—	—	—	—	—

Subtract / கழித்தல்

___ / 5

9	5 8	4 6	8 1 6	7 0 0
<u>- 3</u>	<u>- 7</u>	<u>- 3 9</u>	<u>- 5 3 5</u>	<u>- 3 5 4</u>
—	—	—	—	—

Multiply / பெருக்கல்

___ / 5

4	6	2 4	5 2	1 0 3
<u>× 2</u>	<u>× 3</u>	<u>× 2</u>	<u>× 5</u>	<u>× 4</u>

Handedness: Left / Right**Pencil holding: 3/4 fingers, close to tip, proper holding, left-handed hook****Behaviour Observation: cooperative, restless, distracted, talkative, slow, adamant, nail biting****Grade:**

E	—
T	—
M	—
Total	-

STUDENT ASSESSMENT SHEETName / பெயர்: _____ Class / வகுப்பு: III Sec / பிரிவு: ____ Date / தேதி: __/__/20

School Name / பள்ளியின் பெயர்: _____ District / மாவட்டம்: _____

ENGLISH

Write capital letters A-Z / A-Z எழுதவும் ____ / 26

Write Small letters a-z / a-z எழுதவும் ____ / 26

ENGLISH - Dictation Words / ஆங்கிலம் சொல்வதை எழுதவும் (சொற்கள்) ___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

ENGLISH - Sentence Dictation / ஆங்கிலம் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

ENGLISH

Class III / III வகுப்பு

SEQUENCE ORAL: ____ / 26

READING LETTERS: Caps ____/26; Small ____/ 26

READING WORDS

____ / 15

Sl. no	Words	Read as	Add	Omit	Subs / Int	M/W	b-d/ Inv	Phoneme	Mis pro	L/Id
1	Lake									
2	Form									
3	Know									
4	Huge									
5	Shout									
6	Could									
7	Knife									
8	Beach									
9	Noise									
10	Present									
11	During									
12	Pencil									
13	Bought									
14	Family									
15	Decide									
16	Company									
17	Studied									
18	Complete									
19	Father									
20	Trouble									

READING SENTENCES

____ / 10

1. Give respect to elders.
2. The cow gives us milk.
3. My friend writes beautifully.
4. The jungle is full of animals.
5. All parents love their children.
6. The policeman caught the thief.
7. The monkey climbed the tree easily.
8. I saw an aeroplane flying in the sky.
9. She goes on a holiday to see her grandma.

10. Uncle was happy to see his daughter.

TAMIL

Class III / III வகுப்பு

Write Tamil letters அ - ஃ / அ - ஃ எழுதவும்

___ / 13

Write Tamil letters க- கௌ/ க- கௌ எழுதவும்

___ / 12

Write Tamil letters க் - ன் / க் - ன் எழுதவும்

___ / 18

TAMIL - Dictation words / தமிழில் சொல்வதை எழுதவும் (சொற்கள்)

___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

TAMIL - Sentence Dictation / தமிழில் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

9. _____

10. _____

TAMIL - Class III / III வகுப்பு**SEQUENCE ORAL:** அ - ஃ ____ / 13; க - கௌ ____ / 12; க் - ன் ____ / 18**READING LETTERS:** அ - ஃ ____ / 13; க - கௌ ____ / 12; க் - ன் ____ / 18**READING WORDS**

____ / 15

Sl. No.	WORDS	Read as	Add	Omit	Subs / Int	M/r	Phoneme	L/Id
1	நூறு							
2	பாக்கு							
3	ஒளவை							
4	காலம்							
5	நுங்கு							
6	சொல்							
7	விதை							
8	பேனா							
9	கீழே							
10	மேகம்							
11	பொது							
12	காசு							
13	கோழி							
14	மாண்பு							
15	கருணை							
16	மிதிவண்டி							
17	பெட்டி							
18	நாற்காலி							
19	வண்ணங்கள்							
20	குடும்பம்							

READING SENTENCES

____ / 10

1. நாய் வீட்டை காவல் காக்கும்.
2. கிளி ஓர் அழகான பறவை.
3. வாழைப்பழம் வாங்கினேன்.
4. மாலா படத்தைக் கொடுத்தாள்.
5. பாம்பு நீளமாக இருக்கும்.
6. பள்ளியில் குழந்தைகள் தினவிழா நடைபெற்றது.
7. மாணவன் அவசரமாகச் சென்றான்.
8. பொன்னன் பழம் கொடுத்தான்.

9. ஓளவையார் ஓர் சிறந்த பெண் புலவர்.

10. என்றும் சோம்பல் கொள்ளாதே.

ARITHMETIC / கணக்கு

Class: III / III வகுப்பு

SEQUENCE ORAL:1-20: _____ / 20: 20 to 1 _____ / 20

READING NUMBERS: 1-20: _____ / 20

Write number 1 to 20 / 1 - 20 எழுதவும்

____ / 20

Write 45 - 26 / 45 - 26 எழுதவும்

____ / 20

What comes before and after? முன் - பின் எண்களை எழுதவும்

____ / 10

____, 900, ____.
____, 371, ____.
____, 1000, ____.

____, 263, ____.
____, 500, ____.

Fill in with equal (=) greater (>) or lesser (<) signs / விடுப்பட்ட இடத்தில் > < = சரியானதை நிரப்பவும் ____ / 5

200

945

3000

954

2999

1050

1051

199

Write the number names / எழுத்தில் எழுதவும்

____ / 5

451 - _____

144 - _____

2012 - _____

4319 - _____

1010 - _____

Write the numerals / எண்களில் எழுதவும்

____ / 5

Seven hundred and sixty-nine - _____
 Three hundred and fifteen - _____
 One thousand and twenty one - _____
 Four thousand nine hundred and thirteen - _____
 Eight thousand and eighty - _____

Addition / கூட்டல்

_____/4

9 4	9 9	4 8 2	7 7 7
+ 1 3	+ 3 5	+ 5 2 4	+ 5 6 5
_____	_____	_____	_____
_____	_____	_____	_____

Subtract / கழித்தல்

_____/4

7 6	9 6	9 4 3	7 0 0
- 3 5	- 2 7	- 2 2 1	- 4 3 8
_____	_____	_____	_____
_____	_____	_____	_____

Multiply / பெருக்கல்

_____/4

8 4	8 0	1 2 5	1 0 4
× 3	× 6	× 4 3	× 5 2
_____	_____	_____	_____

Divide / வகுத்தல்

_____/4

4) 4 8

5) 6 5

6) 3 5 4

4) 1 0 8

Handedness: Left / Right

Pencil holding: 3/4 fingers, close to tip, proper holding, left-handed hook

Behaviour Observation: cooperative, restless, distracted, talkative, slow, adamant, nail biting

Grade:

E -

T -
M -
Total -

STUDENT ASSESSMENT SHEET

Name / பெயர்: _____ Class / வகுப்பு: IV Sec / பிரிவு: ____ Date / தேதி: __/__/20

School Name / பள்ளியின் பெயர்: _____ District / மாவட்டம்: _____

ENGLISH

Write capital letters A-Z / A-Z எழுதவும் ____ / 26

Write Small letters a-z / a-z எழுதவும் ____ / 26

ENGLISH - Dictation Words / ஆங்கிலம் சொல்வதை எழுதவும் (சொற்கள்) ___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

ENGLISH - Sentence Dictation / ஆங்கிலம் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____
2. _____
3. _____
4. _____

5. _____
 6. _____
 7. _____
 8. _____
 9. _____
 10. _____

ENGLISH

Class IV / IV வகுப்பு

SEQUENCE ORAL: ____ / 26

READING LETTERS: Caps ____ / 26; Small ____ / 26

READING WORDS

____ / 15

Sl. No	Words	Read as	Add	Omit	Subs / Int	M/r	b-d / Inv	Phoneme	Mis pro	L/Id
1	Hide									
2	Calm									
3	From									
4	Daily									
5	Could									
6	Follow									
7	Decide									
8	Visitor									
9	Florist									
10	Before									
11	Indeed									
12	Church									
13	Disease									
14	Protect									
15	Daughter									
16	Pumpkin									
17	Direction									
18	Library									
19	Complain									
20	Important									

READING SENTENCES

____ / 10

1. The ball is made of rubber.

2. There is a bridge over the river.
3. She is an obedient girl.
4. The elephants were eating sugarcane.
5. There are a few red roses in the garden.
6. My aunt bought me an ice-cream.
7. The thirsty ducks went in search of water.
8. The deer ran for his life when he saw the tiger.
9. The train arrived on time but left five minutes late.
10. A pirate is a person who attacks and robs ship.

TAMIL

Class IV / IV வகுப்பு

Write Tamil letters அ - ஃ / அ - ஃ எழுதவும்

___ / 13

Write Tamil letters க- கௌ/ க- கௌ எழுதவும்

___ / 12

Write Tamil letters க் - ன் / க் - ன் எழுதவும்

___ / 18

TAMIL - Dictation words / தமிழில் சொல்வதை எழுதவும் (சொற்கள்)

___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

TAMIL - Sentence Dictation / தமிழில் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____

2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

TAMIL

Class IV / IV வகுப்பு

SEQUENCE ORAL: அ - ஃ ____ / 13; க - கௌ ____ / 12; க் - ன் ____ / 18

READING LETTERS: அ - ஃ ____ / 13; க - கௌ ____ / 12; க் - ன் ____ / 18

READING WORDS

__ / 15

Sl. No.	WORDS	Read as	Add	Omit	Subs / Int	M/r	Phoneme	L/Id
1	பதட்டம்							
2	பம்பரம்							
3	வெங்காயம்							
4	தோரணம்							
5	மாம்பழம்							
6	வெளிச்சம்							
7	பேருந்து							
8	வான்கோழி							
9	அறிவுரை							
10	காப்பாற்று							
11	பருவமழை							
12	குளிர்ச்சி							
13	நோயாளி							
14	தொலைபேசி							
15	சுதந்திரம்							
16	துணிவு							
17	விஞ்ஞானி							
18	மூவேந்தர்கள்							
19	ஒற்றுமை							
20	பொற்றாமரை							

READING SENTENCES

__ / 10

1. சோம்பல் கொள்ளாதே.
2. நாய் வீட்டை காவல் காக்கும்.
3. அம்மா அவசரம் அவசரமாக சென்றார்.
4. பள்ளியில் குழந்தைகள் தினவிழா நடைபெற்றது.
5. திருவள்ளூர் திருக்குறளை இயற்றினார்.
6. மருத்துவர் நோயாளிகளை சோதனை செய்தார்.
7. நதி கடலில் சென்று கலக்கும்.
8. உதவி செய்பவருக்கு நாம் நன்றி கூற வேண்டும்.
9. காந்தி மண்டபத்தை கண்டு களித்தேன்.
10. மக்கள் நமது தேசியக் கொடியிற்கு வணக்கம் செலுத்தினர்.

ARITHMETIC / கணக்கு

Class: IV/ IV வகுப்பு

SEQUENCE ORAL: 1to 20: _____ / 20; 20 to 1 ____ /20

READING NUMBERS – 1-20: _____ / 20

Write number 1 to 20 / 1 - 20 எழுதவும்

____ / 20

Write 64 -45 / 64 - 45 எழுதவும்

____ / 20

What comes before and after? முன் - பின் எண்களை எழுதவும்

____ / 10

_____, 500, _____.
 _____, 780, _____.
 _____, 2015, _____.

_____, 120, _____.
 _____, 900, _____.

Fill in with equal (=) greater (>) or lesser (<) signs / விடுப்பட்ட இடத்தில் > < = சரியானதை நிரப்பவும்

200 _____
 717 _____

199 _____
 771 _____

1050 _____
 3000 _____

1051 _____
 2999 _____

2409 _____ 5409

Write the number name / எழுத்தில் எழுதவும் _____ / 5

151 - _____
 144 - _____
 2021 - _____
 30439 - _____
 251300 - _____

Write the numerals for / எண்களில் எழுதவும் _____ / 5

Three hundred and sixty-nine - _____
 One thousand and fifty-one - _____
 Four thousand eight hundred and twenty one - _____
 Eighty thousand and eight - _____
 Two lakh three hundred and one - _____

Addition / கூட்டல் _____ / 4

9 4	9 9 7	4 8 2 6	7 7 7 3
+ 1 3	+ 3 5 2	+ 5 2 4 7	+ 5 6 5 8
_____	_____	_____	_____
_____	_____	_____	_____

Subtract / கழித்தல் _____ / 4

8 9	4 5 6	4 1 6	1 0 0 0
- 4 5	- 3 4 6	- 2 3 5	- 7 8 4
_____	_____	_____	_____
_____	_____	_____	_____

Multiply / பெருக்கல் _____ / 4

8 4	7 0	1 2 6	1 0 4
× 7	× 6	× 8 3	× 9 2
_____	_____	_____	_____

Divide / வகுத்தல் _____ / 4

_____	_____	_____	_____
7) 4 8	6) 7 2	6) 3 2 4	4) 1 3 8

Handedness: Left / Right**Pencil holding: 3/4 fingers, close to tip, proper holding, left-handed hook**

Behaviour Observation: cooperative, restless, distracted, talkative, slow, adamant, nail biting

Grade:

E -
T -
M -
Total -

STUDENT ASSESSMENT SHEET

Name / பெயர்: _____ Class / வகுப்பு: V Sec / பிரிவு: ____ Date / தேதி: __/__/20

School Name / பள்ளியின் பெயர்: _____ District / மாவட்டம்: _____

ENGLISH

Write capital letters A-Z / A-Z எழுதவும் _____ / 26

Write Small letters a-z / a-z எழுதவும் _____ / 26

ENGLISH - Dictation Words / ஆங்கிலம் சொல்வதை எழுதவும் (சொற்கள்) ___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

ENGLISH - Sentence Dictation / ஆங்கிலம் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

20	Complaints									
----	------------	--	--	--	--	--	--	--	--	--

READING SENTENCES

___ / 10

1. The bus was packed with noisy children.
2. We are expected to develop love and friendship with all.
3. Planting of trees help to conserve the soil.
4. She is the cleverest girl in our class.
5. Gandhiji fought for Indian freedom.
6. The wind blew hard on a stormy day.
7. Our soldiers fought bravely for the country.
8. The principal has given him punishment.
9. Chennai city is hotter than Mumbai.
10. The emperor built a beautiful tomb for his beloved wife.

TAMIL

Class V / V வகுப்பு

Write Tamil letters அ - ஃ / அ - ஃ எழுதவும்

___ / 13

Write Tamil letters க- கௌ/ க- கௌ எழுதவும்

___ / 12

Write Tamil letters க் - ன் / க் - ன் எழுதவும்

___ / 18

TAMIL - Dictation words / தமிழில் சொல்வதை எழுதவும் (சொற்கள்)

___/15

- | | | |
|----------|----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |

5. _____ 10. _____ 15. _____

TAMIL - Sentence Dictation / தமிழில் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

TAMIL

Class V / V வகுப்பு

SEQUENCE ORAL: அ - ஃ ___/ 13; க - கௌ ___/12; க் - ன் ___/18

READING LETTERS: அ - ஃ ___/ 13; க - கௌ ___/12; க் - ன் ___/18

READING WORDS

___ / 15

Sl. No.	WORDS	Read as	Add	Omit	Subs / Int	M/r	Phoneme	L/Id
1	பள்ளம்							
2	நண்பன்							
3	நெருப்பு							
4	வானொ-							
5	கோடைக்காலம்							
6	தொடர்வண்டி							
7	நூலகம்							
8	ஆலோசனை							
9	பூந்தோட்டம்							
10	சுற்றுலா							
11	புத்துணர்ச்சி							
12	முன்னோர்கள்							
13	வெறிச்சோடிய							
14	வைகறை							
15	கிணற்றினுள்ளே							
16	காற்றோட்டம்							
17	பகுத்தறிவு							
18	ஆபரணம்							
19	நல்லொழுக்கம்							

20	வைரீரியம்							
----	-----------	--	--	--	--	--	--	--

READING SENTENCES

___ / 10

1. மரங்கள் மேகத்தைக் குளிர செய்து மழை பெய்ய செய்கின்றன.
2. மின்சாரம் அல்லது மின்சக்தியைக் கண்ணால் காண இயலாது.
3. விழா நாளன்று பெண்கள் கோவிலின் முன் பொங்கல் இடுவர்.
4. காலையில் வீசும் காற்று உடம்புக்கு நல்லது.
5. வீட்டை சுற்றி தோட்டம் அழகாக அமைக்கப்பட்டுள்ளது.
6. கல்வி செல்வம் அழியா செல்வம்.
7. கதிரவன் தோன்றியதால் காரிருள் மறைந்தது.
8. தொட்டாற் சுருங்கியின் இலை தொட்டவுடன் சுருங்கும்.
9. பேருந்து திடீரெனக் குலுக்கலுடன் நின்றது.
10. மல்லிகை தருவது நல்ல மணம்.

ARITHMETIC / கணக்கு

Class: V / V வகுப்பு

SEQUENCE ORAL- 1 to 20: _____ / 20; 20 to 1 _____ / 20**READING NUMBERS - 1-20: _____ / 20****Write number 1 to 20 / 1 - 20 எழுதவும்**

___ / 20

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Write 120 - 101 / 120 - 101 எழுதவும்

___ / 20

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

What comes before and after? முன் - பின் எண்களை எழுதவும்

___ / 10

_____, 780, _____.

_____, 9900, _____.

_____, 263, _____.

_____, 2015, _____.

_____, 9391, _____.

Fill in with equal (=) greater (>) or lesser (<) signs / விடுப்பட்ட இடத்தில் > < = சரியானதை

நிரப்பவும்

___ / 5

2001 _____ 1999 1050 _____ 1051
 3000 _____ 2999 9455 _____ 9544
 2409 _____ 5409

Write the number name / எழுத்தில் எழுதவும்

___ / 5

3044 - _____
 20121 - _____
 34099 - _____
 50010 - _____
 2581003 - _____

Write the numerals for / எண்களில் எழுதவும்

___ / 5

Three hundred and sixty-nine - _____
 One thousand fifty-one - _____
 Nine Lakh five hundred and thirteen - _____
 Eighteen thousand and eighty - _____
 Four crore seven hundred and eleven - _____

Addition / கூட்டல்

___ / 4

$$\begin{array}{r} 94 \\ + 63 \\ \hline \end{array}$$

$$\begin{array}{r} 979 \\ + 395 \\ \hline \end{array}$$

$$\begin{array}{r} 8826 \\ + 5247 \\ \hline \end{array}$$

$$\begin{array}{r} 7773 \\ + 5608 \\ \hline \end{array}$$

Subtract / கழித்தல்

___ / 4

$$\begin{array}{r} 89 \\ - 45 \\ \hline \end{array}$$

$$\begin{array}{r} 456 \\ - 397 \\ \hline \end{array}$$

$$\begin{array}{r} 7106 \\ - 2055 \\ \hline \end{array}$$

$$\begin{array}{r} 9000 \\ - 2784 \\ \hline \end{array}$$

Multiply / பெருக்கல்

___ / 4

$$\begin{array}{r} 84 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 720 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 526 \\ \times 53 \\ \hline \end{array}$$

$$\begin{array}{r} 5854 \\ \times 96 \\ \hline \end{array}$$

Divide / வகுத்தல்

___ / 4

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 8) 483 \end{array}$$

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 5) 729 \end{array}$$

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 6) 3248 \end{array}$$

$$\begin{array}{r} \underline{\hspace{2cm}} \\ 7) 1390 \end{array}$$

Handedness: Left / Right

Pencil holding: 3/4 fingers, close to tip, proper holding, left-handed hook

Behaviour Observation: cooperative, restless, distracted, talkative, slow, adamant, nail biting

Grade:

E -
T -
M -
Total -

STUDENT ASSESSMENT SHEET

Name / பெயர்: _____ Class / வகுப்பு: VI Sec / பிரிவு: ____ Date / தேதி: __/__/20

School Name / பள்ளியின் பெயர்: _____ District / மாவட்டம்: _____

ENGLISH

Write capital letters A-Z / A-Z எழுதவும் ____ / 26

Write Small letters a-z / a-z எழுதவும் ____ / 26

ENGLISH - Dictation Words / ஆங்கிலம் சொல்வதை எழுதவும் (சொற்கள்) __/15

- | | | |
|----------|----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |

17	Sacrifice									
18	Donation									
19	Expensive									
20	Pollution									

READING SENTENCES

___ / 10

1. Children like to eat sweets.
2. The mouse is under the chair.
3. A man becomes happy by helping others.
4. Reading story books is the best hobby.
5. Many people say the old house on the hill is haunted.
6. At the city museum there is an interesting exhibition on guns.
7. The Titanic hit an ice berg and sank into the sea.
8. I got a mysterious phone message today.
9. My parents complained the hotel manager as the food in the restaurant was terrible.
10. There is not much entertainment in this town, so life is a little dull.

TAMIL

Class VI / VI வகுப்பு

Write Tamil letters அ - ஃ / அ - ஃ எழுதவும்

___ / 13

Write Tamil letters க- கௌ/ க- கௌ எழுதவும்

___ / 12

Write Tamil letters க் - ன் / க் - ன் எழுதவும்

___ / 18

TAMIL - Dictation words / தமிழில் சொல்வதை எழுதவும் (சொற்கள்)

___/15

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

TAMIL - Sentence Dictation / தமிழில் சொல்வதை எழுதவும் (வாக்கியம்) ___/10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

TAMIL - Class: VI / VI வகுப்பு

SEQUENCE ORAL: அ - ஃ ___/ 13; க - கௌ ___/12; க் - ன் ___/18

READING LETTERS: அ - ஃ ___/ 13; க - கௌ ___/12; க் - ன் ___/18

READING WORDS

___/ 15

Sl. No.	WORDS	Read as	Add	Omit	Subs / Int	M/r	Phoneme	L/Id
1	கொலுசு							
2	நோயாளி							
3	மழலை							
4	கண்ணொளி							
5	தீண்டாமை							
6	ஒற்றுமை							
7	வான்வெளி							
8	மாசற்ற							
9	யோசனை							
10	திரௌபதி							
11	பௌர்ணமி							
12	கோடைக்காலம்							
13	தொடர்வண்டி							
14	நன்மை							
15	சுற்றுலா							
16	பற்பசை							

What comes before and after? முன் - பின் எண்களை எழுதவும்
___ / 10

_____, 780, _____.
_____, 263, _____.
_____, 4361, _____.

_____, 9900, _____.
_____, 3001, _____.

Fill in with equal (=) greater (>) or lesser (<) signs / விடுப்பட்ட இடத்தில் > < = சரியானதை நிரப்பவும்

2001	_____	1999	7717	_____	7771
3000	_____	2999	9455	_____	9544
2409	_____	5409			

Write the number name / எழுத்தில் எழுதவும் _____ / 5

1434 - _____
21021 - _____
13499 - _____
500010 - _____
10022583 - _____

Write the numerals for / எண்களில் எழுதவும் _____ / 5

Five thousand and twenty five - _____
Twenty one thousand and fourteen - _____
Ninety-one lakh five hundred and thirteen - _____
Two crore eight thousand and eighty one - _____
Four million three hundred thousand - _____

Addition / கூட்டல் _____ / 4

9 4 6	9 9 0	4 8 2 6	7 7 7 3
+ 1 3 3	+ 3 5 7	+ 5 2 4 7	+ 5 6 5 8
<u>2 0</u>	<u>7 6 4</u>	<u>9 7 9 7</u>	<u>4 7 8 2</u>
_____	_____	_____	_____

Subtract / கழித்தல் _____ / 4

8 9 2	4 5 2 0	4 1 0 7	9 3 0 2
- 4 5 1	- 3 4 6 8	- 2 0 5 5	- 2 8 4 7
_____	_____	_____	_____

Multiply / பெருக்கல் _____ / 4

8 4	4 7 9	5 6 6	6 0 5 8 4
× 9	× 8	× 8 3	× 9 6 3
_____	_____	_____	_____

Divide / வகுத்தல்

— /

4

$4095 \div 5$

$13815 \div 9$

$7572 \div 16$

$26775 \div 13$

Handedness: Left / Right**Pencil holding: 3/4 fingers, close to tip, proper holding, left-handed hook****Behaviour Observation: cooperative, restless, distracted, talkative, slow, adamant, nail biting****Grade:**

E -

T -

M -

Total -

APPENDIX – V**KEY**

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P
Q	R	S	T
U	V	W	X
Y	Z		

a	b	c	d	e	f
g	h	i	j	k	l
m	n	o	p	q	r
s	t	u	v	w	x
y	z				

अ	ब	इ	ऋ	ॠ	ॡ
---	---	---	---	---	---

எ ஏ ஐ ஒ ஓ ஔ ஐ

க் ங் ச் ஞ் ட் ண்

த் ந் ப் ம் ய் ர்

ல் வ் ழ் ள் ற் ன்

க கா கி கீ கு கூ

கெ கே கை கொ கோ கௌ

ENGLISH CLASS II
DICTATION – WORDS

1. Cat	2. Bed	3. Sit	4. Dog	5. Bus
6. Ball	7. Nest	8. Ship	9. Doll	10. Duck
11. Apple	12. Table	13. Mother	14. Lion	15. House

DICTATION – SENTENCES

1. My name is _____.
2. I go to school.
3. The sun is hot.
4. An apple is red.
5. Cow gives us milk.

6. The dog is barking.
7. I love my mother.
8. There are ten hens.
9. Teacher teaches us.
10. There are many pages in the book.

TAMIL II

CLASS II - DICTATION WORDS

1. மரம்	2. கண்	3. கூடு	4. புறா	5. தாத்தா
6. ஆலயம்	7. விசிறி	8. பெட்டி	9. நேரம்	10. குதிரை
11. ஊஞ்சல்	12. ஞாயிறு	13. கொக்கு	14. தோரணம்	15. ஓளவையார்

DICTATION SENTENCES

1. அம்மா வா.
2. நிலா பார்.
3. பழம் தா.
4. மயில் ஆடும்.
5. வீடு கட்டு.
6. பந்து வீசு.
7. மலை ஏறு.
8. கடல் அலை.
9. கோலம் போடு.
10. எங்கள் வீட்டுப் பூனை.

ENGLISH - CLASS III

DICTATION - WORDS

1. Park	2. Tent	3. King	4. Fold	5. Drum
6. Clock	7. Chair	8. Near	9. People	10. Camel
11. Monkey	12. Brother	13. Family	14. Garden	15. Flower

DICTATION - SENTENCES

1. My name is _____.
2. Horse runs very fast.
3. The sea is blue.

4. Do you love your country?
5. I am going to school.
6. Birds fly in the sky.
7. Tiger is our national animal.
8. My mother went to buy fruits.
9. The cat is sitting near the wall.
10. The boys are playing in the ground.

**TAMIL - CLASS III
DICTATION WORDS**

1. ஆலமரம்	2. மஞ்சள்	3. நேற்று	4. மோதிரம்
5. கண்ணீர்	6. கோவில்	7. வானவில்	8. நாற்கா-
9. பொங்கல்	10. தெய்வம்	11. குருவிக்கூடு	12. காவடியாட்டம்
13. கொடுத்தான்	14. பள்ளிக்கூடம்	15. தபால்காரன்	

DICTATION SENTENCES

1. பாடம் படி.
2. ஆலமரம் பெரியது.
3. சிறுவன் சிரித்தான்.
4. மலையில் மழை பெய்தது.
5. பூனை எ- யைத் துரத்தியது.
6. சூரியன் வெளிச்சம் தரும்.
7. மாண்களில் அழகானவை புள்ளிமாண்கள்.
8. மீன் தண்ணீரில் வாழும்.
9. பாப்பா பாடலை எழுதியவர் பாரதியார்.
10. தொலைக்காட்சியில் செய்திகளை தவறாமல் பார்ப்பேன்.

ENGLISH - CLASS IV

DICTATION - WORDS

1. Crab	2. Them	3. File	4. Rock	5. Jump
6. Pencil	7. Globe	8. Doctor	9. Boat	10. Rain
11. Keep	12. Because	13. Natural	14. Elephant	15. Umbrella

DICTATION - SENTENCES

1. My name is _____.
2. The big cat saw a rat.
3. Could you please open the window?

4. The baskets are on the table.
5. We enjoyed the summer camp.
6. My brother could ride cycle.
7. She was happy to see her best friend.
8. A doctor treats the sick people.
9. The fisherman caught a fish with his net.
10. There are beautiful deer in the zoo.

TAMIL - CLASS IV

DICTIONATION WORDS

1. அமைதி	2. காற்று	3. தேநீர்	4. மருந்து	5. காய்கறி
6. தூக்கம்	7. வேடிக்கை	8.கண்ணாடி	9.மிதிவண்டி	10. கடற்கரை
11.மழைத்தூறல்	12.திடீரென்று	13.அரண்மனை	14.வியாபாரம்	15.செய்தித்தாள்

DICTIONATION - SENTENCES

1. நான் நான்காம் வகுப்பில் படிக்கிறேன்.
2. பூக்களைப் பறிக்காதீர்.
3. மலையில் மழை பெய்தது.
4. மல்- கை அழகான மலர்
5. ஆற்றில் வெள்ளம் வந்தது
6. தாயை காணாமல் குழந்தை அழுதது.
7. ஓளவையார் ஓர் சிறந்த பெண் புலவர்.
8. மாண்களில் அழகானவை புள்ளிமாண்கள்.
9. கல்வி செல்வம் அழியா செல்வம்.
10. கோவில் மணியோசை கேட்டது.

ENGLISH - CLASS V

DICTIONATION – WORDS

1. Page	2. Flew	3. Wife	4. Nose	5. Luck
6. Window	7. Happily	8. Button	9. White	10. Tomorrow
11. Cloud	12. Laugh	13. Trouble	14. Country	15. Biscuit

DICTIONATION - SENTENCES

1. My name is _____

2. The eye doctor checked my vision.
3. The students gathered in the ground for a race.
4. The joke was so funny, it made me laugh.
5. It is hot in summer and cold in winter.
6. The roses had grown up against the wall of the cottage.
7. Children love to ride on the elephant's back.
8. My uncle gave me a wrist watch.
9. Is your school too far from your house?
10. The wooden furniture was repaired by the carpenter.

TAMIL - CLASS V

DICTIONATION - WORDS

1. ஆகாயம்	2. கட்டளை	3. சந்தனம்	4. புத்தகம்
5. விளையாட்டு	6. கொடுத்தான்	7. குறிக்கோள்	8. இருட்டறை
9. பூஞ்சோலை	10. செல்வாக்கு	11. மின்சாரம்	12. தோரணம்
13. கதிரவன்	14. விடியற்காலை	15. நாட்டுப்பற்று	

DICTIONATION - SENTENCES

1. அன்பில் மலர்வது மனம்
2. கோழி முட்டை இடும்
3. சிறுவன் பொம்மை விற்றான்.
4. ஆற்றிலே வெள்ளம் வந்தது.
5. வானில் சந்திரன் ஒளி வீசியது.
6. மரத்தில் புறாக்கள் தங்கியிருந்தன.
7. பள்ளியில் ஆண்டு விழா நடைபெற்றது.
8. வீட்டுக்கு ஒரு மரம் வளர்ப்போம்.
9. இமயமலை மிகவும் உயரமான மலை.
10. சுற்றுப்புறத்தை தூய்மையாக வைத்துக் கொள்ள வேண்டும்

ENGLISH - CLASS VI

DICTIONATION - WORDS

1. Mask	2. Test	3. Kick	4. More	5. Club
6. Gloves	7. Success	8. Phone	9. Bravely	10. Variety
11. Survive	12. Round	13. Curious	14. Neighbour	15. Daughter

DICTIONATION - SENTENCES

1. My name is _____.
2. The elephant was caught in a trap.
3. Did the train arrive on time?
4. There are too many people in this room.
5. She thought of buying a pair of scissors.
6. The sun looked beautiful when it sets.
7. Fire crackers cause a lot of air pollution.
8. Freedom fighters fought bravely for our country.
9. My parents are going on a world tour this year.
10. Water becomes a solid when it freezes.

TAMIL – CLASS VI

DICTIONATION - WORDS

1. ஆலயம்	2. தாலாட்டு	3. களைப்பு	4. விஞ்ஞானி
5. வேற்றுமை	6. சான்றோர்	7. தீண்டாமை	8. பகலவன்
9. தொழிற்சாலை	10. ஆண்டுதோறும்	11. கூர்மையான	12. மருத்துவமனை
13. ஏற்றத்தாழ்வு	14. முதலமைச்சர்	15. இன்றியமையாதது	

DICTIONATION - SENTENCES

1. தோட்டம் அழகாயுள்ளது
2. சான்றோருக்கு பொய்யாமையே விளக்கு.
3. விளையாட்டு ஒழுக்கத்தை உருவாக்ககின்றது.
4. பிறப்பில் உயர்வு தாழ்வு கூடாது.
5. தமிழுக்கு இனிமை என்னும் பொருள்.
6. பனை இலையால் பெட்டி செய்தான்.
7. பனி கடுமையாக பெய்து கொண்டிருந்தது.
8. பாரதியார் நூற்றுக்கணக்கான பாடல்களை இயற்றிள்ளார்.

9. நெல் வய- ல் பயிர்கள் பசுமையாக வளர்ந்திருந்தன.

10. நான்கு கால்களை உடைய காரணத்தால் நாற்கா- எனப்பட்டது.

ENGLISH

CLASS: II

Sl. no	Read the Words / படித்துக் காட்டவும்
1	Bag
2	Hen
3	Wig
4	Dot
5	Cup
6	Kite
7	Door
8	Ship
9	Bird
10	Thin
11	Grass
12	Clock
13	Swing
14	Stone
15	Small
16	Pencil
17	Brother
18	Garden
19	Kitchen
20	Picture

Read the sentences / படித்துக் காட்டவும்

1. This is my house.
2. These are our books.
3. Fish lives in the water.
4. Goat eats grass.
5. We see with our eyes.
6. My grandfather is very old.
7. Driver drives the bus.
8. The Sun rises in the East.
9. I will eat fruits and vegetables.

10. I play in the garden with my pet dog.

TAMIL

CLASS II

Sl. No.	Read the Words / படித்துக் காட்டவும்
1	அணில்
2	ஆலமரம்
3	கப்பல்
4	இலை
5	காகம்
6	கிளி
7	சீப்பு
8	குரங்கு
9	பூண்டு
10	தென்னை
11	மேற்கு
12	மாதம்
13	பொங்கல்
14	நிறம்
15	கொட்டை
16	சோம்பு
17	காற்று
18	வெளவால்
19	வண்டி
20	வாழைப்பூ

Read the sentences / படித்துக் காட்டவும்

1. அறம் செய விரும்பு.
2. எங்கள் பள்ளி நல்ல பள்ளி.
3. அம்மா மிகவும் நல்லவர்.
4. மாலையில் சிறிது நேரம் விளையாடு.
5. எங்கள் குடும்பம் சிறிய குடும்பம்.
6. நாய் வீட்டை காக்கும்.
7. யானை கரும்பைத் தின்னும்.
8. கொக்கு வெள்ளை நிறம்.
9. நாம் கால்களால் நடக்கிறோம்.
10. வாரத்தின் நாட்கள் ஏழு.

ENGLISH

CLASS: III

Sl. no	Read the Words / படித்துக் காட்டவும்
1	Lake
2	Form
3	Know
4	Huge
5	Shout
6	Could
7	Knife
8	Beach
9	Noise
10	Present
11	During
12	Pencil
13	Bought
14	Family
15	Decide
16	Company
17	Studied
18	Complete
19	Father
20	Trouble

Read the sentences / படித்துக் காட்டவும்

1. Give respect to elders.
2. The cow gives us milk.
3. My friend writes beautifully.
4. The jungle is full of animals.
5. All parents love their children.
6. The policeman caught the thief.
7. The monkey climbed the tree easily.
8. I saw an aeroplane flying in the sky.
9. She goes on a holiday to see her grandma.
10. Uncle was happy to see his daughter.

TAMIL

CLASS III

Sl. No.	Read the Words / படித்துக் காட்டவும்
1	நூறு
2	பாக்கு
3	ஒளவை
4	காலம்
5	நூங்கு
6	சொல்
7	விதை
8	பேனா
9	கீழே
10	மேகம்
11	பொது
12	காசு
13	கோழி
14	மாண்பு
15	கருணை
16	மிதிவண்டி
17	பெட்டி
18	நாற்காலி
19	வண்ணங்கள்
20	குடும்பம்

Read the sentences / படித்துக் காட்டவும்

1. நாய் வீட்டை காவல் காக்கும்.
2. சிளி ஓர் அழகான பறவை.
3. வாழைப்பழம் வாங்கினேன்.
4. மாலா படத்தைக் கொடுத்தாள்.
5. பாம்பு நீளமாக இருக்கும்.
6. பள்ளியில் குழந்தைகள் தினவிழா நடைபெற்றது.
7. மாணவன் அவசரமாகச் சென்றான்.
8. பொன்னன் பழம் கொடுத்தான்.
9. ஒளவையார் ஓர் சிறந்த பெண் புலவர்.
10. என்றும் சோம்பல் கொள்ளாதே.

Sl. No	Read the Words / படித்துக் காட்டவும்
1	Hide
2	Calm
3	From
4	Daily
5	Could
6	Follow
7	Decide
8	Visitor
9	Florist
10	Before
11	Indeed
12	Church
13	Disease
14	Protect
15	Daughter
16	Pumpkin
17	Direction
18	Library
19	Complain
20	Important

Read the sentences / படித்துக் காட்டவும்

1. The ball is made of rubber.
2. There is a bridge over the river.
3. She is an obedient girl.
4. The elephants were eating sugarcane.
5. There are a few red roses in the garden.
6. My aunt bought me an ice-cream.
7. The thirsty ducks went in search of water.
8. The deer ran for his life when he saw the tiger.
9. The train arrived on time but left five minutes late.
10. A pirate is a person who attacks and robs ship.

Sl. No.	Read the Words / படித்துக் காட்டவும்
1	பதட்டம்
2	பம்பரம்
3	வெங்காயம்
4	தோரணம்
5	மாம்பழம்
6	வெளிச்சம்
7	பேருந்து
8	வான்கோழி
9	அறிவுரை
10	காப்பாற்று
11	பருவமழை
12	குளிர்ச்சி
13	நோயாளி
14	தொலைபேசி
15	சுதந்திரம்
16	துணிவு
17	விஞ்ஞானி
18	மூவேந்தர்கள்
19	ஒற்றுமை
20	பொற்றாமரை

Read the sentences / படித்துக் காட்டவும்

1. சோம்பல் கொள்ளாதே.
2. நாய் வீட்டை காவல் காக்கும்.
3. அம்மா அவசரம் அவசரமாக சென்றார்.
4. பள்ளியில் குழந்தைகள் தினவிழா நடைபெற்றது.
5. திருவள்ளூர் திருக்குறளை இயற்றினார்.
6. மருத்துவர் நோயாளிகளை சோதனை செய்தார்.
7. நதி கடலில் சென்று கலக்கும்.
8. உதவி செய்பவருக்கு நாம் நன்றி கூற வேண்டும்.
9. காந்தி மண்டபத்தை கண்டு களித்தேன்.
10. மக்கள் நமது தேசியக் கொடியிற்கு வணக்கம் செலுத்தினர்.

ENGLISH

CLASS: V

Sl. No	Read the Words / படித்துக் காட்டவும்
1	Sing
2	Fold
3	Chose
4	Tired
5	Snacks
6	Tonic
7	Broad
8	Famous
9	Wisdom
10	Enough
11	Quarter
12	Through
13	Mixture
14	Stubborn
15	Musician
16	Envelope
17	Several
18	Explosion
19	Identify
20	Complaints

Read the sentences / படித்துக் காட்டவும்

1. The bus was packed with noisy children.
2. We are expected to develop love and friendship with all.
3. Planting of trees help to conserve the soil.
4. She is the cleverest girl in our class.
5. Gandhiji fought for Indian freedom.
6. The wind blew hard on a stormy day.
7. Our soldiers fought bravely for the country.
8. The principal has given him punishment.
9. Chennai city is hotter than Mumbai.
10. The emperor built a beautiful tomb for his beloved wife.

TAMIL

CLASS: V

Sl. No.	Read the Words / படித்துக் காட்டவும்
1	பள்ளம்
2	நண்பன்
3	நெருப்பு
4	வானொ-
5	கோடைக்காலம்
6	தொடர்வண்டி
7	நூலகம்
8	ஆலோசனை
9	பூந்தோட்டம்
10	சுற்றுலா
11	புத்துணர்ச்சி
12	முன்னோர்கள்
13	வெறிச்சோடிய
14	வைகறை
15	கிணற்றினுள்ளே
16	காற்றோட்டம்
17	பகுத்தறிவு
18	ஆபரணம்
19	நல்லொழுக்கம்
20	வெளியம்

Read the sentences / படித்துக் காட்டவும்

1. மரங்கள் மேகத்தைக் குளிர செய்து மழை பெய்ய செய்கின்றன.
2. மின்சாரம் அல்லது மின்சக்தியைக் கண்ணால் காண இயலாது.
3. விழா நாளன்று பெண்கள் கோவிலின் முன் பொங்கல் இடுவர்.
4. காலையில் வீசும் காற்று உடம்புக்கு நல்லது.
5. வீட்டை சுற்றி தோட்டம் அழகாக அமைக்கப்பட்டுள்ளது.
6. கல்வி செல்வம் அழியா செல்வம்.
7. கதிரவன் தோன்றியதால் காரிருள் மறைந்தது.
8. தொடர்ந்து சுருங்கியின் இலை தொடர்வுடன் சுருங்கும்.
9. பேருந்து திடீரெனக் குலுக்கலுடன் நின்றது.
10. மல்லிகை தருவது நல்ல மணம்.

Sl. No	Read the Words / படித்துக் காட்டவும்
1	Tone
2	Listen
3	Snakes
4	Lunch
5	Aspect
6	Channel
7	Vehicles
8	Harbour
9	Request
10	Sensible
11	Reason
12	Facility
13	Courage
14	Message
15	Fracture
16	Patiently
17	Sacrifice
18	Donation
19	Expensive
20	Pollution

Read the sentences / படித்துக் காட்டவும்

1. Children like to eat sweets.
2. The mouse is under the chair.
3. A man becomes happy by helping others.
4. Reading story books is the best hobby.
5. Many people say the old house on the hill is haunted.
6. At the city Museum there is an interesting exhibition on guns.
7. The Titanic hit an ice berg and sank into the sea.
8. I got a mysterious phone message today.
9. My parents complained the hotel manager as the food in the restaurant was terrible.
10. There is not much entertainment in this town, so life is a little dull.

TAMIL

CLASS: V1

Sl. No.	Read the Words / படித்துக் காட்டவும்
1	கொலுசு
2	நோயாளி
3	மழலை
4	கண்ணொளி
5	தீண்டாமை
6	ஒற்றுமை
7	வான்வெளி
8	மாசற்ற
9	யோசனை
10	திரௌபதி
11	பௌர்ணமி
12	கோடைக்காலம்
13	தொடர்வண்டி
14	நன்மை
15	சுற்றுலா
16	பற்பசை
17	கிரகணம்
18	புறக்கணிப்பு
19	கொள்ளளவு
20	வெண்கலம்

Read the sentences / படித்துக் காட்டவும்

1. யானை மிகுந்த பலமுடைய மிருகம்.
2. பெரியவர் மெதுவாக நடந்தார், இளைஞர் வேகமாக ஓடினார்.
3. கண்ணாடி கீழே விழுந்து நொறுங்கியது
4. சேர்ந்து வாழ்வது பலம், பிரிந்து வாழ்வது பலவீனம்.
5. செயற்கைக்கோள் விண்வெளிக்கு அனுப்பப் பட்டது.
6. குளிர் சாதனப் பெட்டி நீரை உறைய வைக்கும்.
7. விமானப் பணிப்பெண் பயணிகளை உபசரித்து வரவேற்பாள்.
8. நாம் நம் நாட்டை ஒருவரும் அவமதித்துப் பேச இடம் கொடுக்கக்கூடாது.
9. மனம் இருந்தால் மார்க்கம் உண்டு என்பது முன்னோர் வாக்கு.
10. சன்னலைத் திறந்ததும் வெளிச்சம் வீட்டிற்குள் வந்தது.

APPENDIX – V
CERTIFICATES AND PUBLICATIONS

Rehab 2006

This is to certify that

Ms. FAIZ JAHAN

*has participated as
Chairperson / Speaker / Delegate / Volunteer / Sponsor-
at the Regional Seminar on ADHD, Autism, LD Related Disorders in Children
held at Chennai on July 22, 2006*

J. G. Ganesan M
Convener

B. S. V. K.
Organizing Secretary



INDO - US
SCIENCE & TECHNOLOGY
FORUM



Sleep Medicine 2006

An INDO US Symposium

**Theme : Understanding Sleep Disorders
A Clinical Approach**

SOUVENIR

Organized by

Chennai Sleep Disorders Centre
Chennai Institute of Neuroscience
Vijaya Health centre - Chennai

Sleep Disorders Center

Beth Israel Deaconess Medical Centre, Boston, MA

Dept. of Neurology

*SRM Medical College Hospital and Research Centre
Potheri, Kattankolathur*

Endorsed by :



Advancing Sleep Health Worldwide

Date :
1 & 2 December 2006

Venue : **GREEN PARK**
NSK Salai, Vadapalani, Chennai-600 026

Sleep Medicine 2006 An INDO - US Symposium

The Green Park, Chennai

Programme on 1st December 2006

Time	Topic	Speaker
7.15 to 8.00 am	Registration	
8:00 to 10:10 am	Session 1 <i>Basics of Sleep Medicine</i> <i>Chairperson: Dr B Biswakumar, Dr Manvir Bhatia</i>	
8:00 to 8:30	Historical Perspective	<i>Dr Christian Guilleminault</i>
8:30 to 9:00	Anatomy & Physiology of sleep	<i>Dr V Mohan Kumar</i>
9:00 to 9:40	Sleep disorders Classification & approach to a patient with sleep disorder	<i>Dr Sudhansu Chokroverty</i>
9:40 to 10:00	The circadian system	<i>Dr Robert Thomas</i>
10:00 to 10.45 am	Inauguration of Symposium	
<i>Tea break (10.45 to 11.00 a.m.)</i>		
11.00 am - 1.20 pm	Session 2 <i>Sleep Disordered Breathing (SDB)</i> <i>Chairperson : Dr Sudhansu Chokroverty, Dr Zaheer Ahmed Sayeed</i>	
11.00 -11.40	Sleep-disordered breathing An overview	<i>Dr Christian Guilleminault</i>
11.40 -12.10	Positive airway pressure-CPAP/BIPAP	<i>Dr J C Suri</i>
12.10 - 12.40	Complex Sleep Apnoea	<i>Dr Robert Thomas</i>
12.40 - 1.00	Role of Surgery in Sleep disordered breathing	<i>Dr G Gananathan</i>
1.00 - 1.20	Pulmonary Diseases and sleep	<i>Dr A S Natrajan</i>
<i>Lunch (1.20 - 2.00 p.m.)</i>		
2.00- 3.00 pm	Session 3 <i>Oral Appliances in Sleep Disordered breathing</i> <i>Chairperson: Dr C Ravindran, Dr P Tulsidas</i>	
2.00 -2.30 p.m.	Oral Appliances in Sleep Disordered breathing	<i>Dr Micheal Gelb</i>
2.30 -3.00 p.m.	Role of Dental Implants in sleep apnea treatment	<i>Dr Sathya Kallur</i>
3.00 - 5.00 pm	Session 4 <i>Insomnia - Neurobiology, diagnosis and treatment</i> <i>Chairperson : Dr AB Taly, Dr V Natarajan</i>	
3.00 - 3.40 pm	Approach to Insomnia & Recent advances in management	<i>Dr Sudhansu Chokroverty</i>
3.40 - 4.10 pm	Psychiatrist perspective	<i>Dr Sujai Subramaniam</i>
4.10- 4.40 pm	Cognitive and behavioral therapy	<i>Dr BS Virudhagirinathan</i>
4.40 - 5.00 pm	Alternative therapy non pharmacological approach to insomnia	<i>Dr Bindu M Kutty</i>
<i>Tea break (5.00 - 5.15 pm)</i>		
5.15 - 6.45 pm	Session 5 <i>Medical Disorders and Sleep</i> <i>Chairperson: Dr K Jagannathan, Dr P K Sethi</i>	
5:15 - 5:30 pm	Stroke and Sleep Disorders	<i>Dr G Arjundas, Dr P K Sethi</i>
5:30 - 5:45 pm	Movement Disorders and Sleep	<i>Dr Suresh Kumar</i>

cont.

Time	Topic	Speaker
5:45 - 6:00 pm	Epilepsy and Sleep	<i>Dr Garima Shukla</i>
6.00 - 6.15 pm	Ageing, Dementia and Sleep	<i>Dr R Sridharan</i>
6.15 - 6.30 pm	Environment and Sleep with reference to high altitude	<i>Dr Usha Panjwani</i>
6.30 - 6.45 pm	Cardiovascular Disease and SDB	<i>Dr Ajith Mullaseri</i>
7.30 pm - Banquet		
9.30 to 12.00 pm Work Shop I Hall 2 (Live titration Overnight workshop) Moderators: <i>Dr Robert Thomas, Mr Kevin Vigneault R.P.S.G.T, Mr Brennden McGeehan, R.P.S.G.T, Tyco CPAP Titration Masks: Lilane G RPSGT</i>		
Programme on 2nd December 2006		
8.00 - 10.10 am Session 6 Restless Leg Syndrome, REM behavioral disorder and others <i>Chairperson : Dr A Paneer, Dr L Shankaranarayanan</i>		
8:00 - 8.30 am	Excessive daytime sleepiness- Evaluation & Approach	<i>Dr Manvir Bhatia</i>
8.30 - 9.00 am	Sleep Pharmacology	<i>Dr Robert Thomas</i>
9.00 - 9.30 am	REM behavioral Disorders	<i>Dr Sudhansu Chokroverty</i>
9.30 - 10.10 am	Pathophysiology and therapeutic aspects restless leg Syndrome RLS	<i>Dr Wayne Henning</i>
Tea Break (10.10 to 10.30 a.m.)		
10.30 - 12.30 pm Session 7 Circadian Rhythm Disorders, Narcolepsy <i>Chairperson : Dr AV Srinivasan, Dr Deepak Arjundas</i>		
10.30 - 11.00 am	Circadian Rhythm Disorders	<i>Dr Li Ling Lim</i>
11.00 - 11.30 am	Periodic leg movements	<i>Dr Wayne Henning</i>
11.30 - 12:00 pm	Narcolepsy	<i>Dr C Guilleminault</i>
12.00 - 12.30 pm	Crime and Sleep (Forensic Aspects)	<i>Dr Puvanendran</i>
12.30 - 1.30 pm	Panel Discussion- Sleep Disorders <i>Moderators : Dr Sudhansu Chokroverty, Dr Zaheer Ahmed Sayeed</i> <i>Panelist: Dr Manvir Bhatia, Dr JC Suri, Dr Wayne Hening, Dr Christian Guilleminault</i>	
Lunch Break (1.30 - 2.00 pm)		
2.00- 5.00 pm Parallel Session 8 Pediatric Sleep Disorders (Focus on difference from adults) <i>Chairperson : Dr G Kumarresan, Dr S Jayam., Dr K Pandian</i>		
2.00 - 2.30 pm	Ontogeny of Sleep	<i>Dr Sudhansu Chokroverty</i>
2.30 - 3.00 pm	Behavioral disorders and sleep	<i>Dr B S Virudhagirinathan</i>
3.00 - 4.00 pm	Pathophysiology and treatment of sleep apnea	<i>Dr C Guilleminault</i>
4.00 - 4.20 pm	RLS pediatric aspects	<i>Dr W Henning</i>
4.20- 4.40 pm	Narcolepsy Pediatric aspects	<i>Dr C Guilleminault</i>
Tea Break : (4.40 - 5.00 pm)		

ABSTRACT**BEHAVIOURAL DISORDERS AND SLEEP IN CHILDREN**

Dr. B.S. VIRUDHAGIRINATHAN, D.Sc., Ph.D, FIACP, C.Psy (UK), MINPs.S (USA)

Ms. LEENA SUBRAMANIAN, MA, M.Phil. (Cl.Psy.), Mrs. FAIZ JAHAN, M.Sc.

Disruptions to normal sleep routines can have serious effects on the well being of both children and parents. Sleep disturbance has been linked to children's cognitive functioning and emotional regulation.

Night-time fear, Sleep walking, Bedwetting, Bruxism, Sleep-talking and Rhythmic Movement Disorder (RMD) are some of the common behaviour and sleep disorders in children. Head-banging, head-rolling, body-rocking and body-rolling are the four types commonly seen in Rhythmic Movement Disorder (RMD). RMD is common in infancy and stops by four years of age. It occurs during lighter NREM sleep. Thumb-sucking is one of the most common disorder with children which may extend even up to adolescence.

Recent research on children with Attention Deficit Hyperactivity Disorder (ADHD) show that 70-80% of children had sleep problems. Research studies have identified that children with Autism related disorders have sleep problems, which causes havoc in the family.

Management of sleep disorders in ADHD and Autism related disorders children is mainly medical but occupational therapy, sensory integration and biophysical intervention were reported to be beneficial. Behavioral approaches in the management of sleep problems in these children seem to be more rewarding and yield long term results.

ABSTRACT**COGNITIVE AND BEHAVIOUR THERAPY IN SLEEP DISORDERS**

Dr. B.S. VIRUDHAGIRINATHAN, D.Sc., Ph.D, FIACP, C.Psy (UK), MINPs.S (USA)

Ms. LEENA SUBRAMANIAN, MA, M.Phil. (Cl.Psy.), Mrs. FAIZ JAHAN, M.Sc.

Lack of sleep can cause many physical and psychological problems in one's life. We spend nearly a third of our lives sleeping. Although people have remained awake for close to nineteen days, research studies indicate that most of us find it difficult to stay awake for more than 60 hours. When we are deprived of sleep, we get cranky and have difficulty concentrating. We sleep to replenish our resources. Sleep is necessary to maintain biological functions.

Sleep disorders fall into three categories: insomnia, disorders of REM sleep and disorders of Non-REM sleep. Anxiety or excitement can interfere with sleep. Depression seems to be one of the most common symptoms in chronic insomnia. Treatment of underlying depression helps to overcome insomnia.

Insomniacs can be their own worst enemies. Many such people use barbiturates or alcohol to help them sleep. Over time the nervous system adapts to these drugs: if people take them for several nights, they begin to lose the ability to get sleep without drugs. In addition, although barbiturates and alcohol tend to make people sleepy, they disrupt normal sleep rhythms, especially those of REM sleep.

Drug or pharmacotherapy is effective for both sleep onset and sleep maintenance in insomniacs. For short-term treatment plan medication may be helpful, but for long term management of sleep disorders, a combined pharmacotherapy and cognitive and behaviour therapy maintain a good improvement in insomniacs.

Behaviour therapy techniques such as Jacobson's Progressive Muscle Relaxation (PMR), Desensitization, Aversion Therapy, Anxiety Relief Conditioning and Cognitive Behaviour Therapy seem to be quite effective psychological treatment techniques in the management of sleep disorders.

**Anderson Diagnostics & Help Child
International Conference on Behavioural Sciences**

This is to certify that

R. FAIZ JAHAN

has participated as Chairperson / Speaker / Delegate / Volunteer / Sponsor
held at GRT Convention Centre, Chennai.

on Friday, January 29, 2010


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"Research Methodology & Biostatistics"

organized by the Department of Epidemiology,

The Tamil Nadu Dr. M.G.R. Medical University from 13th June 2011 to 17th June 2011.

This educational activity has been awarded **30 Credit Points**
by the Centre for Accreditation, The Tamilnadu Dr. M.G.R. Medical University.

Mayil Vahanan Natarajan

Dr. MAYIL VAHANAN NATARAJAN

M.S.Orth. M.Ch.Orth. (L'pool) Ph.D. D.Sc. F.R.C.S. D.Sc. (Hon)³

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HOD i/c, DEPT. OF EPIDEMIOLOGY

Wednesday, February 15, 2012

Final Program

Fortieth Annual Meeting

International Neuropsychological Society

February 15-18, 2012
 Montréal, Québec, Canada

WEDNESDAY, FEBRUARY 15, 2012

9:00 AM–12:00 PM

Wednesday Morning Continuing Education Courses
 Refer to CE Schedule for Location

12:00–4:00 PM

Students of INS (SINS) Workshop: Writing Successful Grants in
 Neuropsychology
 Speakers: Mark Aloia, Rob Paul
 Verdun

1. ALOIA, MS

Students of INS (SINS) Workshop: Writing Successful Grants in Neuropsychology

1:00–4:00 PM

Wednesday Afternoon Continuing Education Courses
 Refer to CE Schedule for Location

4:15–5:45 PM

Poster Session 1: Cognitive Rehabilitation/MS and
 Demyelination/Memory/Cross-cultural
 Salons Fontaine A and B

Cross Cultural

1. ANDERSON, EC

Written Expression Performance of Bilingual versus Monolingual College Students

2. BENNETT, J

The Relationship Between Phonemic Fluency and IQ in Hispanic Bilingual Students

3. CROSSLEY, M

The Northern Cultural Assessment of Memory (N-CAM): Normative Data from an Inner-city Clinic

4. JENKINS, JR

Supports Efficacy and Validity of a Cognitive Screen for Aboriginal Adults

5. JOSHI, R

Bilingual Proficiency and Contextual Memory Performance in a Hispanic Adult Sample
 Real-World Validity of Cross-Cultural Neuropsychological Testing: Cognitive Functioning and
 Occupational Level in India

6. LAU, KM

Set-shifting, mental flexibility, and bicultural stress among Chinese American adults

7. MARTINEZ REYES, DA

Monolingual and Multilingual Performance Differences on Tests of Unstructured Visuoconstruction
 Ability and Contextual Memory

8. RABIN, LA

Trends in the Neuropsychological Assessment of Ethnic Minorities: A Survey of Neuropsychologists in
 the U.S. and Canada

9. RITCHIE, D

Selection Criteria for Clinical Neuropsychology Internships

10. SAEZ, P

The Impact of Sociocultural and Neurological Variables on Nonverbal Neuropsychological Test

11. SCOTT, BM

Performance Among Latino/a Epilepsy Patients

12. THAMES, A

Determination of Suspect Effort: Primarily Spanish-Speaking TBI Patients and the Test of Memory

Malingering

Neuroimaging & neuropsychological assessment among African Americans: The impact of literacy

Cognitive Intervention/Rehabilitation

13. BELCHIOR, P

The Association of a Multidimensional Construct of Useful Field of View With Standardized
 Visuospatial and Non-Visuospatial Measures

14. BOGDANOVA, Y

Trial of Cognitive Rehabilitation in Anoxic Brain Injury

15. CAHILL, LS

Maximising Memory: An Interdisciplinary Pilot Project Of Group Self-Management For Those With
 Mild Cognitive Impairment

16. CARSTENS, J

The Effects of Goal Management Training in Undergraduate Students with Problems in Attention
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17. CONSTANTINO, M

CBT improves cognition and reduces amount of seizures in children

18. FAHMI, H

Web-based Delivery of a Cognitive Training Program

27. STAIKOVA, E
28. STERN, M
29. SUHR, J
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34. WIJK, KL
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49. NAKACAWA, Y
50. BEGUM, F
51. NATHAN, B
52. NATHAN, B
53. MERIGHI TABAQUIM, M
54. OSMON, DC
55. OSMON, DC
56. PINHEIRO GRENITTE, PA
57. PINHEIRO GRENITTE, PA
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59. GONÇALVES, TS
60. PINHEIRO GRENITTE, PA
61. RIMRODT, S
62. WILLIAMS, BL
63. WILLIAMS, VJ
64. WILSON, LM
65. LAMÔNICA, DC
66. LAMÔNICA, DC
67. LAMÔNICA, DC
68. AILION, A
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- And the Snowman Melted: Narrative Discourse Profiles of Children with ADHD
Incremental Validity of the D-KEFS in Diagnostic Assessment of Adolescents with ADHD
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The Effects of Response Expectancies on Task Performance in Adults Concerned about ADHD
Impaired Performance on the TOVA is not Specific to ADHD
Neuropsychological Endophenotypes in Developmental ADHD Versus ADHD in Epilepsy
Inhibition, Selective Attention, and Parent Reported ADHD Symptoms in 5-Year-Old Internationally Adopted Children
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Psychological profile and executive functions in adults with Attention Deficit and/or Hyperactivity Disorder
- Learning Disabilities/Academic Skills**
- Inhibition Assessment in Reading Disabilities: Stroop Test versus Five Digit Test
Relationships Between Visuo-spatial and Reading Skills in a Group of Colombian Children Diagnosed With Poor Reading Garden-variety
Phonological Awareness and the Development of Reading Abilities in a Group of Colombian Children with Non-specific Poor Reading Skills
Neurobiological Correlates of Sentence Comprehension in Children with Specific Reading Comprehension Disability
One more step: Does walking impact adding?
Magnitude Representation, Spatial Abilities, and Mathematical Performance in Adults
Developmental dyslexia: Volumetric analysis of regional variability in the cerebellum
Dissociation between Online and Offline Learning in Developmental Dyslexia
Implicit Learning Deficits in Individuals with Dyslexia
Relations between Cognitive Functioning and Early Academic Skills in Preschool-Aged Children with NF1
Counting Procedural Skill and Conceptual Knowledge in Kindergarten as Predictors of Grade 1 Math Skills
Symbolic and Non-symbolic Magnitude Comparison and Math Skills in Adults
Grammatical difficulties in deaf children: Assessing the comprehension of written Japanese
Prevalence of Learning Disability in School Children from Different Educational System in South India
A Study on the Awareness and Perception of Learning Disability (LD) among Teachers in Tamil Nadu
A Study on the Awareness and Perception of Learning Disability (LD) among Parents
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Interdisciplinary Neuropsychological Evaluation of children with changes development of communication and learning
- Language and Speech Functions/Aphasia**
- Psycholinguistics skills in diplegic cerebral palsy children
Infantile development and receptive vocabulary abilities in Brazilian children with Congenital Hypothyroidism
Longitudinal Analysis of Risk Factors Affecting Reading Trajectories in Children Diagnosed with Pediatric Brain Tumors
Sign Language Aphasia in Probable Alzheimers Disease
Thalamus Connectivity: What Can Diffusion Tractography Tell Us about Reading Difficulties in Children?
Cognitive Correlates of Qualitative Aspects of Verbal Fluency Performance
Neuroanatomic Correlates of Clustering on Verbal Fluency Tasks in Healthy Adults

Participants and Methods: Participants were kindergarten and first grade students ($N = 193$). Measures included rote counting forward and backward, counting objects, number (number identification and quantity discrimination), cognitive (working memory and phonological awareness) and behavior (behavioral inattention) factors. Hierarchical regression analyses were used to test the amount of variance the counting variables explained over and above the other variables.

Results: A step-by-step model building method showed that while both types of counting were predictive of each outcome, in the overall models the number factors accounted for variance over and above the counting predictors. Further, the number variables were the best predictors for each model, but secondary variables included verbal working memory and conceptual counting knowledge for fluency, phonological awareness and procedural counting for computation, and verbal and visuospatial working memory, phonological awareness, and procedural counting for the applied reasoning model.

Conclusions: Therefore, counting procedural skill and conceptual knowledge should be considered when screening for early math difficulties, but their contributions should be considered along with other relevant number and cognitive factors for more robust prediction.

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E.C. MAXWELL, R.B. MARTIN, J.T. ELIAS, A.M. LOPEZ & P.T. CIRINO. Symbolic and Non-symbolic Magnitude Comparison and Math Skills in Adults.

Objective: Magnitude comparison (MC) has been widely studied in children (Brankaer et al., 2011), including its relationship to math (Desoete et al., 2010). Properties of symbolic (Butterworth et al., 2001) and non-symbolic MC (Revkin et al., 2011) have been studied in adults, though less often together (but see Ansari et al., 2007); still less is known about their relationship to math, especially in the context of cognitive factors. Such knowledge may expand the relevance of MC beyond children and help to understand math difficulties in adults. We hypothesized that MC would predict math in adults even in the context of broader skills.

Participants and Methods: College undergraduates ($N = 99$) completed computer tasks of symbolic and non-symbolic MC (speed and/or accuracy). Math outcomes included WJ-III Math Fluency, Calculations, and algebraic computations. Cognitive measures included WJ-III Block Rotation (spatial) and Cross-Out (processing speed), CTOPP Elision (phonological awareness), and a spatial working memory task. Regression analyses evaluated contributions.

Results: MC skills were predictive of Math Fluency ($R^2 = .19, p < .0002$). Adding cognitive variables improved models ($R^2 = .27, p < .0002$), and symbolic MC ($p < .0006$) and processing speed ($p < .02$) were unique predictors. The model for Calculations was significant ($R^2 = .26$), with contributions from spatial skills and math fluency. For algebra, the model was significant ($R^2 = .15, p < .03$) with phonological awareness and symbolic MC as unique predictors; when math fluency was added ($R^2 = .33, p < .0001$) symbolic MC was not significant.

Conclusions: Symbolic, but not non-symbolic, MC was predictive of math in adults, which is consistent with findings in children (Holloway & Ansari, 2009). Despite the relevant measures chosen, the amount of variance predicted was not large, though similar to other studies of math (Cirino et al., 2002). Further study might focus on other number-based skills and non-cognitive factors, as well as populations with math difficulty.

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Y. NAKAGAWA, W. TAKEI & T. KOYAMA. Grammatical difficulties in deaf children: Assessing the comprehension of written Japanese.

Objective: The objective is to evaluate the grammatical abilities of children with a hearing loss and to reveal the comprehension difficulties of written Japanese that children with hearing loss encounter.

Participants and Methods: The participants of this study were 130 children aged between five and twelve years-old with a hearing loss.

They were assessed using a Japanese written grammatical test (J.COSS: Japanese test for comprehension of syntax and semantics). The J.COSS is multiple-choice text consisting of 20 blocks of 4 items each. Each item has four choice pictures. The participants were required to select one picture that corresponds to a grammatical construction in written Japanese. In answering the questions, no verbal communication was required.

Results: Whenever a participant correctly answered the four questions in each grammatical item, we assumed that they could understand that item (pass). As in Guttman's reproducibility of reliability scale analysis of 0.86, the development of 20 grammatical items was determined by a step-by-step order in accordance with the passing rate. Among the 20 grammatical items, the Hearing Loss children have consistently shown a lower score than the Normal Hearing children except for the noun block. Moreover, the Hearing Loss children displayed particular difficulties in understanding the reversible passive and the Japanese case particles.

Conclusions: The study investigated the development of the written Japanese grammar and showed the overall delay of grammatical competence acquisition of the children with Hearing Loss as compared to the ones with Native Hearings ability. Specifically, the Hearing Loss children revealed the difficulties comprehending reversible passive and Japanese case particles.

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F. BEGUM, B. NATHAN & V. VENGATESAN. Prevalence of Learning Disability in School Children from Different Educational System in South India.

Objective: To study prevalence of LD, Classification of LD in English, Tamil and Arithmetic in different education system CBSE, Matriculation, Anglo-Indian, State Board (SB).

Participants and Methods: By Systematic Random sampling 200 normal school children class II to VI, 50 from each education system equal boys and girls. Standardized LD Assessment Test used with reliability 0.71

Results: Overall prevalence of Learning Disability (LD) in different education system 20.8% (18.93% - 22.86%) proportion with 95% CI. Significant difference in Prevalence of LD in different education system with high prevalence in SB 16.65%*

Overall prevalence of LD in English 12.65%, Tamil 32.09%, Arithmetic 23.66%

Significant difference in LD in Oral, Writing and Reading in English* Significant difference in LD in Writing 5.76%, Reading 5.48% and Oral 1.15%, in English in different education system*

Significant difference in LD in Writing 10.03%, Oral 9.28% and Reading 8.35% in Tamil*

Significant difference in LD in English and Tamil 11.79%* with proportion to 95% CI

Significant association between LD in Writing in Maths > Tamil > English and different education system.

* $P=0.001$

Conclusions: Overall LD 20.8%

Significant difference in prevalence of LD in different education system with high prevalence in SB school

LD more significant in Tamil

Significant association between prevalence of LD in Writing in Maths > Tamil > English and different education system.

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F. BEGUM, B. NATHAN & V.A. SATHISH. A Study on the Awareness and Perception of Learning Disability (LD) among Teachers in Tamil Nadu.

Objective: To study the level of awareness and perception of LD among school teachers, educational qualification, work experience, gender and age.

Participants and Methods: LD awareness / perception questionnaire was developed by the authors and reliability was 0.74. By random sampling method 560 teachers were selected from different schools. The questionnaire consists of 24 items on the domains of Media, Facilities, General, Medical, Attention, Academics. It is self administered.

Results: Overall awareness of LD among teachers 75% (73.8% - 76.3%) proportion with 95% CI.

Significant association between awareness of LD and Age of Teachers $P=0.001$

Significant association between awareness of LD and gender $P=0.04$

Significant association between the educational qualification and awareness on LD $P=0.05$

Significant association between teaching class and awareness on LD $P=0.001$

Conclusions: Overall awareness on LD among teachers 75%

Age of teachers influences LD awareness.

Work experience of teachers influences LD awareness.

Female teachers have better awareness on LD.

Higher Secondary class teachers have better awareness on LD.

Post-graduate teachers have better awareness on LD.

Higher the teaching class better the awareness on LD

Teachers have 78% LD awareness on the domain of Facilities for LD children.

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F. BEGUM, V.A. SATHISH & B. NATHAN. A Study on the Awareness and Perception of Learning Disability (LD) among Parents.

Objective: To study the level of awareness and perception of LD among parents, age, educational qualification, income.

Participants and Methods: LD awareness / perception questionnaire was developed by the authors and reliability was 0.74. By random sampling method 327 parents were selected from different schools. The questionnaire consists of 24 items on the domains of Media, Facilities, General, Medical, Attention, Academics. It is self administered.

Results: Overall awareness of LD among parents 68% (66.4% - 69.3%) proportion with 95% CI.

Significant association between awareness of LD and Age of fathers $P=0.03$

Significant association between awareness of LD and Age of mother $P=0.001$

Significant association between parents educational qualification and awareness of LD $P=0.001$

Significant association between parents LD awareness and class in which student studying $P=0.03$

Significant association between level on income of parents and awareness of LD $P=0.05$

Conclusions: Overall awareness of LD among parents 68%

1/3 of parents do not have adequate LD awareness.

As the age of father increases better the awareness of LD.

Middle age group mothers have better LD awareness.

Significant association between parents education qualification and awareness of LD.

Higher the class the child in, better the LD awareness among parents.

As the income increases better the LD awareness.

Sibling and mother tongue does not influence LD awareness among parents.

Parents have 78% LD awareness on the domain of Facilities for LD children.

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A. NIQUERITO & M. MERICHI TABAQUIM. Constructive Dyspraxia in Children with Cleft Lip and Palate.

Objective: Apraxia reflects dysfunction of the motor cortical level. When planning the execution of previously learned movements, we use stored cortical representations. Any change that compromise this particular area can lead to information loss needed to perform complex movements. Constructive dyspraxia is the difficulty in reproduce or copy a visual model presented in the absence of visual disturbances, perceptual or motor.

Participants and Methods: In this study 85 individuals participated, both sexes, aged 7 to 12 years with cleft lip and palate repair. The following instruments were used: Raven's Colored Progressive Matrices Test and Graph-Percept-Motor Koppitz Bender-Santucci.

Results: The results showed that 72.9% of children had changes in motor performance, with performance below the age, showing immaturity in perceptual-motor skills, essential to the acquisition, consolidation and stability in the learning of motor sequences. The quality of the track proved to be unstable, especially in the angles construction, using rotation compensate resources and lack of integration of perceptual-motor information on the task realization.

Conclusions: Children with cleft lip and palate showed perceptomotor changes characteristic from the constructive dyspraxia. The results point to dysfunctions in different levels, from the cortico-subcortical, cortical-striatal and cortico-cerebellar circuits that contribute to motor behavior in the graphical construction activities, important to the development of formal ability in writing.

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W. RUENZEL, A. KOZLOWSKI, E.A. ANDRESEN, B. GREEN & D.C. OSMON. Factor Invariance between Credible and Noncredible Performers on the Word Memory Test.

Objective: This study examined factor structure of the WMT.

Participants and Methods: 270 learning disability clinic referrals and simulation analogue research participants were included.

Results: Common exploratory factor analysis on the entire sample demonstrated a unifactorial structure with all variables loading around .9 (CNS=.78, communality<.6) and having Cronbach's Alpha of at least .94. In the credible performers (N=161, Cronbach's Alpha all>.7) an initial factor had loadings from DR, MC, and PA with a second factor with loadings on IR and CNS.

Noncredible performers (N=110, Cronbach's Alpha all>.83) had an initial factor with loadings from IR and DR and a second factor with loadings from MC and PA, while CNS had loadings below .35 on both factors.

Conclusions: The following conclusions seem warranted:

1. The WMT's unifactorial structure may be an artifact of combining disparate groups.

2. The factor analyses in this study can be criticized because of non-normal distributions; however, internal consistency was good in all groups.

3. Present results should be replicated using Confirmatory Factor Analysis.

4. Factorial invariance between credible and noncredible performers suggests that effort is not a continuous variable.

5. Several constructs appear to compose the WMT depending upon the population being evaluated.

6. Credible performers showed memorial (DR, MC, PA) and reliable recognition (IR and CNS) factors.

7. Noncredible performers showed memorial factor (IR, DR) and underperforming on difficult tasks (MC, PA) factors.

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Developing cognitive behaviour therapy training in India: Using the Kolb learning cycle to address challenges in applying transcultural models of mental health and mental health training

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Abstract

Although mental health workers in India across all major professional groups have identified an unmet need for training in cognitive behaviour therapy (CBT), the uncritical export of models of mental health, therapy provision and training to low- and middle-income countries is a problematic process. This paper describes the context for the first stand-alone CBT training programme in India, based in Chennai. This paper includes an evaluation of the first phase of the training and information from trainees regarding the quality and applicability of the training to their working context. The paper provides an overview of some of the critiques that are pertinent to this process and considers the way that the Kolb learning cycle can be used as a framework within training to go some way to addressing these difficulties.

Introduction

Indian mental health services in context

Mohandas (2009) summarized the current state of psychiatric and psychologically informed mental health services in India. In a country of 1.3 billion people, with the world's twelfth largest economy, 22% of the population live in a state of economic exclusion that places them below the poverty line. Although it is a rapidly urbanizing country the majority of people still live in rural or semi-rural areas where an informal, agrarian economy is predominant. In the expanding cities there is considerable strain on civic amenities in terms of access to healthcare, education, public transport and housing. The national adult literacy rate is 64.8%; however, this varies considerably between regions and between urban and rural populations and men have considerably higher levels of literacy than women. India has no official national language although somewhere between 15 and 18 major languages are recognized with over 300 additional languages spoken in different regions. The breadth of cultural, ethnic and linguistic diversity in India can be understood as analogous to that across the whole of Europe, although the geographical and economic isolation of

some regions in India means that there is even less cultural homogeneity.

India has both a free-to-use public health system which includes psychiatric provision and an extensive network of private medical hospitals and independent mental health practitioners working from stand-alone clinics. These private facilities include psychiatrists, clinical psychologists, psychologists with counselling backgrounds trained to master's degree level and other allied health professionals such as social workers, occupational therapists and psychiatric nurses.

There is also a considerable network of care provided by a variety of people in healing roles drawing on local understandings of distress and indigenous systems of medicine. Some of these approaches are specific to particular cultural or ethnic groups within India although there is a broad base of shared understanding that links them. For example, the Tibetan Buddhist community, which is found both in the north of India in regions that have been ethnically Tibetan for thousands of years and in more recent settlements as far south as Tamil Nadu, uses an approach to treating mental distress that draws on an Ayurvedic understanding of physical health of Hindu origin, Tibetan beliefs in demonic possession, and

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Buddhist prayer and meditation. Treatment within this tradition can include prayer, herbal medicine, exercise, specific diets, and religious practice (Plakum, 2008). There are similar models of responding to distress within other communities which also draw on a range of indigenous approaches. Although it is likely that these traditions remain strong in rural areas it is unlikely that the newly urbanized populations of India, who experience considerable cultural displacement in this process, would have ease of access to these treatments or a model of health and well-being that would seek these out as a first kind of treatment.

Mohandas (2009) demonstrated a considerable shortfall in the provision of state-funded mental health services which use a psychiatric and psychologically informed model of treatment, and surmised that the shortfall was unlikely to be met by private mental healthcare given current rates of unmet need and low levels of investment in training and resource development in this area.

Rates of mental health problems in Indian community samples are at least equivalent to those found in studies in the UK. For example, Poongothai et al.'s (2009) study used a modified Patient Health Questionnaire to look at depression rates in a sample of 26,001 people in Chennai. The questionnaire used was validated in the local population as part of the study and adaptations increased the number of questions from 9 to 12 to better capture the expression of depression in this group. Overall 15.1% of the sample met clinical criteria for depression. A number of factors were found to be predictive of higher rates of depression. These were gender (16.3% women, 13.9% men), socio-economic status (SES) (lower SES = 19.3%, higher SES = 5.9%) and marital status (divorced 26.5%, widowed 20%, married 15.4%). Being female, economically excluded and divorced or widowed are consistent predictors of rates of depression across cultures and countries (e.g. Mirza & Jenkins, 2004). The impact of poverty on poor mental health is of particular interest in India where almost a quarter of the adult population live below the poverty line (Mohandas, 2009). Those who have the greatest need for mental health services are unlikely to be able to afford to access what private treatment is available either within a psychiatric/psychological or indigenous medical tradition and free-to-use state health services are unlikely to have the capacity to meet the unmet need for support.

Cognitive behaviour therapy in India

In a recent paper Kuruvilla (2010a) summarized the degree to which behavioural and cognitive therapies have developed in India. This paper included a summary of all papers published in the *Indian Journal of*

Psychiatry which reported on the use of cognitive or behavioural treatment techniques. The first paper published was in 1952 on 'Pavlov's influence on psychiatry' and a total of 42 papers were published over a 57-year period. This review included a breakdown of the specific disorders considered by the papers. These have included sexual dysfunction, obsessive-compulsive disorders, writer's cramp, anxiety neurosis, tension headaches, trichotillomania, alcohol misuse, gender identity problems, and psychosis. Four papers, almost 10% of the total published, were identified which used behaviour therapy in the treatment of disorders of sexual preference, specifically male homosexuality, which was illegal in India until 2009. The most recent paper was in 1983, suggesting that in line with most countries the pathologization of homosexuality in mental health services has reduced in recent years.

The majority of the papers reviewed were of behaviour therapy, and Kuruvilla (2010a) notes the excessive use of aversive therapy techniques across all disorders. Kuruvilla (2010a) highlights that 'there is a paucity of original research in [cognitive behavioural therapy] CBT in India and that even after 57 years of co-existence, the relationship between Behaviour Therapy and Indian psychiatry remains a tenuous one' (p. S371).

One landmark study in terms of quality and rigour was published by Manjula (2009). This randomized control trial of CBT for panic disorder compared manualized CBT and BT interventions using a sample of 30 subjects who met ICD-10 criteria for panic disorder with or without depression. The sample included participants some of whom spoke English and the local language of the state where the research was undertaken and some of whom spoke only a local language. A wide range of measures was used to obtain information about the severity, impact and cognitive appraisals associated with the panic disorder. Both groups demonstrated improvement over the course of the study and at follow-up; however, the CBT group showed significantly more improvement on most measures. Adapting CBT in this study for non-English speaking participants is an important development as it provides some support for the idea that the model can be adapted for non-English speaking communities and that good outcomes can be achieved at least for this specific presenting problem. It would, however, be premature to infer too much about the adaptability of the model based on one study with a limited sample size. It is also important to note that there has not been a sufficient allocation of resources for looking at the evidence base of other approaches to distress reduction in India. For example, there are a large number of therapists trained in person-centred counselling skills for whom there has been no investment in evaluating the effi-

cacy of this model when used in India. There has also been no research into the efficacy of treatments based on indigenous health approaches to distress although there has been considerable work by anthropologists in describing them. It may well be that the methods developed within the empirical tradition are not suitable for evaluating these approaches but it would seem helpful to develop a better understanding about how they are helpful at the same time as evaluating imported models of mental health treatment.

In his Presidential address to the Indian Psychiatric Association Mohandas (2009) was clear that 'the time is right to initiate skill development in CBT and other non-pharmacological management strategies' reflecting a growing interest in developing a skilled workforce capable of providing high quality evidence-based therapies within India.

Rahman et al. (2008) reported on an innovative randomized control trial (RCT) in Pakistan which demonstrates that with a modest training programme, supported by high quality monthly supervision, CBT can be developed amongst non-specialist health workers in a similar economic and cultural context. In this study community-based 'lady health workers' employed by the State Health Department were trained in CBT in order to identify and treat postnatal depression. This study had a very large sample size (n = 463 intervention group, 440 control group) and compared home delivered CBT to visits by female health workers (known locally as 'lady health workers') providing the same rates of contact with no specialist mental health intervention. The health workers in the intervention arm had 2 days of intensive training plus a 1-day follow-up training session some months later. The study showed impressive health outcomes in terms of halving the rates of depression in the treatment group but also improvements in terms of physical markers of infant health including take up of immunization, higher rates of breastfeeding and more time spent playing with infants. The researchers reported that the half-day per month group supervision offered as part of the trial was an important factor in maintaining a high quality intervention.

This provision of supervision as a key factor in developing CBT poses considerable challenges in the Indian context, currently there is no state or national funding to build capacity in this area and a marked shortage of local therapists able to support novice users of CBT by providing regular supervision.

Developing mental health services in low- and middle-income countries

As part of a series of papers published in the *Lancet* addressing issues of developing mental health services in low- and middle-income (LMI) countries Eaton

et al. (2011) considered common barriers to service development highlighted in previous studies. This paper notes the considerable gap in provision of mental health services worldwide and frames service development as a process of 'scaling up' services to meet unmet needs. Scaling up refers to a process of increasing the number of people receiving a service and an increase in the range of services offered. This process also includes drawing on or developing evidence-based interventions delivered within a service framework or to populations broadly similar to the one in the country in question. These new services must then be sustainable as a result of political leadership with clear strategies for policy formation, implementation and financing. The paper emphasized the need for local policy-makers and stakeholders to be involved in service development to as large an extent as possible.

The paper reported that evidence-based psychological interventions were almost universally less accessible than pharmacological ones, although innovative programmes to increase psychological therapies in some primary care settings in Chile were noted. It is certainly the case that in India there is a ready availability of psycho-pharmacological treatments available through private general doctors or family doctors, whilst accessing any kind of evidence-based psychological treatment is difficult and, outside of a few key institutions, highly unlikely (Mohandas, 2009).

Patel et al. (2011) reviewed progress in developing mental health services in LMI countries and reported a series of policy initiatives at an international level that support this process as well as advances in a number of countries in fields such as child and adolescent mental health and humanitarian or disaster relief. They particularly note the shortage of trained specialist mental health workers in many countries and report that several initiatives have demonstrated the 'effectiveness of task sharing with non-specialist and lay health workers to address the massive shortage of specialists' (p. 1441). They note three continuing barriers to work in this area; the particular burden of human rights abuses faced by those with serious mental health problems, the failure to allocate adequate budgets by most national health agencies to support the scaling up of services, and lastly the lack of evidence about which programmes are particularly effective in supporting training and service delivery in these countries.

The idea of exporting models of mental health problems and treatments to LMI countries is one that has been the subject of considerable criticism. Fernando (2010) has consistently highlighted the shortcomings of diagnostically led assessment and treatment of mental disorders for black and minority ethnic groups in the developed world and where western models are used as a basis for service develop-

ment in LMI countries. In particular he has considered the failure of these modes to take into account local context and culture and their unsupported assumptions of the universality of mental health problems and treatment efficacy across cultural settings.

Curriculum development and delivery of the CBT training in Chennai

In developing the curriculum we were aware of challenges in developing CBT for non-western settings. CBT was developed primarily in the USA and UK with services and research trials meeting the needs of a predominantly white majority patient population. We were wary of the danger of uncritically importing ideas developed in this context into Indian mental health services. Curriculum development was informed by a paper on the future of CBT in India by Kuruvilla (2010b) which asks 'What methods are most suitable for an illiterate patient who is unable to keep daily records? How can we incorporate/integrate some of our cultural and religious concepts into the practice of CBT?'

The concepts referred to by Kuruvilla are part of the current thinking about the philosophical roots of CBT as having as much to do with Buddhist thought developed in northern India 2,500 years ago. In recent years there has been an increased interest in these origins as opposed to the roots in Stoic philosophy prior to this. This has likely been to do with the growth of third wave CBT approaches, some of which are more explicit about their links to Buddhism. There is further consideration of this in the Discussion section of this paper.

We were also aware that concepts, metaphors and change methods developed in the UK and USA might not translate well into local languages and local models of distress, and that there was a clear need to work collaboratively with course participants to develop clarity regarding how we might successfully translate these ideas.

Participants

Participants in the training programme were all trained professionals of any discipline working in the field of mental health, and all spoke English as a second or third language. All of them had completed postgraduate level training courses taught in English as part of their professional training. Training was based on the idea that local therapists would be the people most likely to be able to engage with and translate these concepts most effectively. In order to facilitate this, when concepts or metaphors were introduced training participants were encouraged to work in pairs or in a larger group to discuss how a concept in English could be translated into local languages. Where possible, people were paired with someone working in a similar

geographical location in order to ensure that they were discussing these ideas with someone who worked with largely similar language groups.

The training programme

The current training programme was designed as a 5-day workshop. The curriculum of the 1-day workshop and the first 2 days of the 5-day workshop were broadly similar, and comprised a brief history of CBT and a trans-diagnostic overview of core principles of assessment, formulation and treatment with a particular emphasis on the collaborative nature of CBT. Day 3 of the 5-day course included teaching on the cognitive behaviour therapist as scientist practitioner (including the evidence base for CBT and the evaluation of research papers), the therapeutic relationship in CBT and a 90-minute workshop in establishing and using peer supervision in CBT. Days 4 and 5 were a workshop in using CBT in the treatment of depression.

Teaching was designed to replicate and illustrate important therapy processes as much as possible. Each day trainees were asked to develop problem lists in implementing CBT in their current practice and to develop goals for that day on the basis of these. The trainer would adapt the day's teaching to these and review the goals at the end of each day to ensure they had been met. The trainer modelled Socratic practice by encouraging discussion amongst the group that led to them developing answers to questions raised rather than these being provided by the trainer. Throughout the training a warm, collaborative and engaging style was modelled. In order to be transparent these strategies were pointed out to trainees as they were being used.

Training was delivered by the first author of this paper (A.B.) who is a clinical psychologist by professional background, and subsequent training will be provided by the British Association of Behavioural and Cognitive Psychotherapists (BABCP) accredited staff from the Salford Cognitive Therapy Training Centre (SCTTC) from core professions including clinical psychology, nursing and social work.

We used the Kolb (1984) learning cycle as the basis for designing this second stage of training. This cycle has four stages:

- Experience: where a skill is practised;
- Observe: where what happened is noticed;
- Reflect: where what happened is related to previous experience and knowledge, this new knowledge is generalized where appropriate;
- Plan: where the practical implications of the new knowledge is integrated and taken forward.

In order to support learning in this way the teaching format took the form of first introducing a core

skill or concept in CBT and role playing this with a trainee playing a patient and the tutor playing the therapist. Trainees then role-played this skill with a peer with both taking turns to be the therapist ('experience' in the Kolb cycle). These role-plays took place in English and local languages. In pairs trainees were encouraged to consider what happened and how the role-play fitted with the presenting problems they typically saw in clinic ('observe'). Then as a group, trainees discussed what had been noticed and discussed, considered issues with introducing the technique into their clinical work and considered commonalities and difference in the issues raised ('reflect'). Lastly, trainees were encouraged to look at how they could take this learning forward into practice ('plan'). This allowed and encouraged a discursive and collaborative approach to learning which emphasized that trainees had the expertise to implement these ideas in their local context. The trainer maintained a collaborative and Socratic stance in discussions in order to facilitate this.

Curriculum planning was informed by the *BABCP Core Curriculum Reference Document* (Hool, 2010) and in conjunction with the CARE Institute of Behavioural Science in Chennai, India, and staff at the Salford Cognitive Therapy Training Centre and the Central Manchester Foundation NHS Trust.

Methods

All participants in the pilot 1-day workshop and the 5-day introductory workshop completed satisfaction with training ratings. In addition to this, participants in the 5-day workshop completed questionnaires developed by Maunder et al. (2008), developed from Myles and Milne (2004). These tests, the MPQ-PC Declarative Knowledge Questionnaire and the PCQ-PC Procedural Knowledge Questionnaire are based on measuring understanding core principles of CBT (MPQ-PC) and clinical application of this knowledge (PCQ-PC) and were marked blind by one of the authors (A.B.). These tests have not been validated in an Indian or other LMI country training programme. The tests were administered in English as all participants had trained in their core professions to postgraduate standards in English and so were considered to be proficient English speakers. Participants were also asked to provide qualitative feedback on the training during the sessions and in written form at the end.

Results

The majority of participants of the 1-day pilot programme were clinical psychologists ($n = 10$) trained to master's degree level. The remaining four partici-

pants were a consultant psychiatrist ($n = 1$) and counsellors trained to master's degree level ($n = 3$).

Participants of the 5-day workshop were more varied in their professional backgrounds. Four were clinical psychologists, three were consultant psychiatrists, one was an occupational therapist specializing in mental health, one a social worker and programme consultant in a leading addictions unit, one a psychotherapist and four counsellors trained to master's degree level.

Participant satisfaction with components of the 1-day pilot workshop and the 5-day workshop were measured using a 5-point Likert scale (5 = strongly agree, 1 = strongly disagree). Overall satisfaction levels were high on all aspects of the course but of note is that all participants fully endorsed the statement that they would recommend the training to others (mean score = 5). On the week-long programme there were high levels of agreement with statements such as 'The workshop improved my understanding of CBT' (mean score 4.7), 'The workshop helped me develop practical skills' (mean score 4.6) and 'Case discussions improved my understanding of CBT' (mean = 4.7).

Considerable qualitative feedback was also obtained by written responses on the evaluation sheets and in group discussion. This feedback was collated and used by the course team to plan further curriculum developments, some of this information has been used to inform the Discussion section of this paper.

All participants in the 5-day programme completed the MPQ-PC Declarative Knowledge Questionnaire and the PCQ-PC Procedural Knowledge Questionnaire (Maunder et al., 2008). The results are compared to those obtained by Primary Care Mental health workers following a shorter training programme in Maunder et al.'s paper. The maximum score possible on the MPQ-PC Declarative Knowledge Questionnaire is 10, and Indian trainees' average scores were 9.2 compared to 9 for UK trainees as shown in Table 1. On the PCQ-PC Procedural Knowledge Questionnaire respondents score 1 point each on 10 questions about applying CBT in clinical practice. Scores can range from 0 (although this in

Table 1. Comparison of knowledge mean scores of UK participants in a primary care CBT training programme and Indian 5-day workshop participants.

	Mean score of UK participants	Mean score of Indian participants
MPQ-PC Declarative Knowledge Questionnaire	9	9.2
PCQ-PC Procedural Knowledge Questionnaire	16.3	18.7

unlikely) to 30 although the range is more likely to be between 10 and 25. Indian trainees' average score was 18.7 compared to an average of 16.3 amongst UK trainees on this test. Scores are broadly similar for both groups indicating that the training methods used led to gains equivalent to those of a comparable UK training programme for UK-based mental health workers.

Discussion

This evaluation demonstrates that CBT training programmes for mental health professionals can be delivered in the Indian mental healthcare context to high levels of participant satisfaction and with good training outcomes. Using the Kolb learning cycle as a way to enable trainees to develop their own solutions to translating CBT into local contexts, languages and presenting problems appears to be a useful one which takes into account issues linked to the problematic import of concepts of mental health developed in very different cultures and contexts. However, with only limited resources it is difficult to know if a good training outcome (beyond participant satisfaction) is achieved without a much more detailed analysis of changes in terms of therapeutic practice and service-user outcomes as a result of this training. An investigation of this kind is beyond the scope of the current study and would need additional resourcing.

The interest generated by these initial courses has been considerable and there are now plans to extend the programme both in terms of numbers of participants and the levels of training. Indian and UK partners are working towards providing both a certificate in CBT (10 days training plus the submission of a case report and peer supervision log) and a diploma in CBT (35 days training plus submission of four case reports, an essay and therapy tapes). It appears that participants in the 5-day workshop preferred the more clinical aspects of teaching (introduction, CBT for depression and the therapeutic relationship in CBT) and were less satisfied with topics to do with the cognitive behavioural therapist as scientist practitioner and evaluating research, which are perhaps more of interest to those with research rather than clinical interests. There appears to be good acquisition of knowledge by participants as measured using the MPQ and PCQ measures, although it is a clear weakness of the current study that knowledge prior to the course was not obtained for comparison. The decision not to collect this information was taken after discussion about this being a deskilling start to the workshop that would not have sat well with the expectations of participants.

The issue of ongoing supervision is a difficult one and our solution at this stage is to train participants in peer supervision, including use of the Cognitive

Therapy Rating scale and the Cognitive Therapy Supervision Rating Scale in order to ensure a degree of fidelity to the model.

It is vital that ideas as to how CBT might develop are shaped by Indian practitioners with appropriate support from bodies such as the BABCP and the World Psychiatric Association. Given that India has a good network of clinical psychology master's level training courses, and that a doctorate level clinical psychology training course is due to start in Chennai in 2014, these might provide a basis for establishing expertise not only in CBT but in the evaluation of local projects in order to establish an evidence base relevant to the local context.

We are aware of the shortfall in provision of trained mental health staff in India (Mohandas, 2009) and the need to develop CBT training for other professionals such as general nurses, community health workers and general doctors in the future; however, a programme of this scale would need considerable institutional support from state health services and a rigorous research programme to evaluate it beyond the scope of the present study.

There were a number of issues raised in discussions which the Kolb learning cycle facilitated. The philosophical precedents of CBT in Buddhist thought (developed in India approximately 2,500 years ago) and Stoic philosophy (developed in Greece 2,300 years ago) are well documented. Antecedents in other philosophical systems are less well understood; however, participants were interested in relating CBT to both Hindu and Jain traditions. The majority of participants were of Hindu religious background. When we considered how a therapist might introduce the idea of anxiety and provide psycho-education about its origin there was considerable interest in using the conversation reported in the Bhagavad-Gita between the Warrior Prince Arjuna and his Charioteer Krishna, an incarnation of Vishnu. On the night before a great battle against his family Arjuna describes what trainees reported as clear symptoms of marked anxiety and rumination. Krishna in this role was described as 'the first counsellor' by trainees in the way he encouraged Arjuna to consider his core values and behave according to them on the day of the battle. The idea in Hindu philosophy relating to reality as a construct of our thoughts was seen as one that could also be readily incorporated into cognitive behavioural work. One participant of a Jain religious background pointed out the close link between the cognitive behavioural idea of engaging with thoughts as beliefs and not literal truth and the need to develop cognitive flexibility with the Jain concept of *anekavroada*. This idea, developed over 2,000 years ago emphasizes that truth is relative to the perspective (or *naya*) of the observer. Reality is therefore seen as a many-sided construct

that one can be trained to understand and engage with from different perspectives. When one takes this into account, statements of fact can only ever be made tentatively and one is led to consider the evidence for and against competing explanations. In discussion, trainees thought that using cultural and religious examples would provide a way of introducing CBT to members of particular religious communities. It is worth noting that there are other therapy traditions, whose philosophical roots can be seen in Buddhist, Hindu or Jain thought. This must be at least in part due to these being some of the oldest philosophical traditions there are, and so it is inevitable that current thinking would be influenced by the frameworks for understanding the nature of adversity and distress established in these systems of thought. There is a danger in over-emphasizing CBT as a therapy whose origins have greater resonance with Indian traditions at the expense of other therapies such as those developed within social constructionist or narrative traditions which can also make similar claims. It might be more useful to say that it is helpful to consider the degree to which CBT can be developed with these in mind or the similarities used to explain or translate the model into the Indian cultural context.

There is clearly considerable work to be done in considering how CBT can be developed in India. Research into whether disorder-specific models developed in a western context are relevant in India would be helpful. Careful consideration of what training models would be most effective, and further research into the therapeutic effectiveness of CBT is essential to determine whether there is a need to further develop this therapy for Indian settings. Outcomes research could usefully compare CBT to other therapies including indigenous models of alleviating distress to establish whether the current interest in developing CBT in India expressed by mental health professionals is supported by a rigorous evidence base. Given the heterogeneity of the population of India it is unlikely that any one therapeutic approach to mental health problems could be thought of as meeting most of the needs of most of the population. There is also the issue of how to work with people with limited literacy or living in remote areas where access to mental health services is also a considerable challenge. Smart phones now have considerable penetration into the Indian telecommunications market and the availability of this technology opens up considerable possibilities in terms of, for example, using audio taping on the phone instead of written thought records for those who cannot read and write well, and therapy being provided into rural areas remotely by telephone. Evidence from Pakistan also suggests that health workers in rural areas can be quickly and cheaply trained up in the basics of CBT and that this

can lead to clinically significant outcomes for populations who might not otherwise access psychological therapies (Rahman, 2008). Consideration of the usefulness of CBT in India should perhaps be better addressed by the question 'Which people, in which context, with which problems would find this therapy useful in alleviating their distress?'

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