INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACY AND CHEMISTRY

Available online at www.ijrpc.com

Review Article

A REVIEW ON THE FACTORS BENEATH THE DEVELOPMENT OF DYSLEXIA

Remya Reghu[1]*, Heleena Cadathuz[2], Jesna Dileep[2], Roshni PR[1] and Meenu Vijayan[1]

[1]Faculty, Department of Pharmacy Practice, Amrita School of Pharmacy, Kochi, Ernakulam, Kerala, India.
[2]Amrita School of Pharmacy, Kochi, Ernakulam, Kerala, India.

ABSTRACT

Dyslexia is defined as an anomalous approach to processing information learning disability that impairs a person's fluency or which can manifest itself as a difficulty with phonological awareness, phonological decoding, processing speed, orthographic coding, auditory short-term memory, language skills/verbal comprehension.[1] Dyslexia, which includes a number of disorders, affecting people's ability to read, is believed to affect 4 to 5 percent of the population, or some 12 million Americans. The new discovery for treating dyslexia, by the use of color filters in reading could lead to methods of detecting dyslexia in infancy, and treatments could begin in very early childhood when the brain's circuitry is most capable of changing. The possibility that reading disability in children is associated with visual problems is in dispute.[2] Dyslexia is distinct from reading difficulties resulting from other causes, such as a non-neurological deficiency with vision or hearing, or from poor or inadequate reading instruction.[15] The present study is to find out the various factors responsible for the development of dyslexia and also its clinical characteristics.

Keywords: Dyslexia, learning disability, poor language skill, children.

INTRODUCTION

There are many definitions of the disorder called dyslexia. The World Federation of Neurology defined dyslexia as follows: "Specific developmental dyslexia is a disorder manifested by difficulty learning to read despite conventional instruction, adequate intelligence, and adequate sociocultural opportunity. It is dependent upon fundamental cognitive disabilities that are frequently of constitutional origin." From the definitions used by dyslexia researchers and organizations around the world, it appears that dyslexia is not one thing but many, in so far as it serves as a conceptual clearing-house for a number of reading skills deficits and difficulties, with a number of causes.[3] It described phonological and surface types of developmental dyslexia by analogy to classical subtypes of acquired dyslexia (alexia) which are classified according to the rate of errors in reading non-words.[10] Most people with dyslexia, who have Border's Dyspathetic type, have attention and spatial difficulties which interfere with the reading acquisition process. Although dyslexia is thought to be the result of a neurological difference, it is not an intellectual disability. Dyslexia is diagnosed in people of all levels of intelligence.

Signs and symptoms

Dyslexia symptoms vary according to the severity of the disorder as well as the age of the individual.

Pre-school age children

Children who exhibit symptoms have a higher risk of being diagnosed as dyslexic than other children. Some of these symptoms are: Delay in learning to speak,Learns new words slowly ,Has difficulty rhyming words, as in nursery rhymes ,Late in establishing a dominant hand.

Early elementary school-age children

Difficulty learning the alphabet ,Difficulty with associating sounds with the letters that represent them (sound-symbol correspondence), Difficulty identifying or generating rhyming words, or counting syllables in words, Difficulty segmenting words into individual sounds, or blending sounds to make words, Difficulty with word retrieval or naming problems ,Difficulty learning to decode words ,Confusion with before/after, right/left, over/under, and so on ,Difficulty distinguishing between similar sounds in words; mixing up sounds in multisyllable words (auditory discrimination) (for example, "aminal" for animal, "bisghetti" for spaghetti).

Older elementary school children

Slow or inaccurate reading ,very poor spelling ,difficulty associating individual words with their correct meanings ,difficulty with time keeping and concept of time, difficulty with organization skills. Due to fear of speaking incorrectly, some children become withdrawn and shy or become bullies out of their inability to understand the social cues in their environment, Difficulty comprehending rapid instructions, following more than one command at a time or remembering the sequence of things, Reversals of letters (b for d) and a reversal of words (saw for was) are typical among children who have dyslexia. Children with dyslexia may fail to see (and occasionally to hear) similarities and differences in letters and words, may not recognize the spacing that organizes letters into separate words, and may be unable to sound out the pronunciation of an unfamiliar word.[4]

Diagnosis

- Formal diagnosis of dyslexia is made by a qualified professional, such as a neurologist, neuropsychologist, developmental pediatrician, or educational psychologist and qualified specialist dyslexia teachers. Evaluation generally includes testing of reading ability together with measures of underlying skills such as tests of rapid naming to evaluate short term memory and sequencing skills, and nonword reading to evaluate phonological coding skills. Evaluation will usually also include an IQ test to know the strengths and weaknesses. While such "discrepancy" tests between full scale IQ and reading level have, on their own, been shown to be flawed, the tests often include interdisciplinary testing to exclude other possible causes for reading difficulties, such as a more generalized cognitive impairment or physical causes such as problems with vision or hearing. The investigated reports whether children born to families with a history of dyslexia are at an elevated risk for the disorder.
- The infants at risk differed from control infants in both their initial responsiveness to sounds and in their change-detection responses dependent on the stimulus context. Currently, lack of access to neuroimaging makes it impractical for diagnosing dyslexia; however, there are testing instruments that can be used to assess the specific manifestations of these neurobiological differences. These instruments assess accurate and/or fluent word recognition, single real word and pseudo word reading fluency, phonological processing, and for older students, spelling deficits and general language competence. There are screening instruments that can be used to identify children at high risk for dyslexia as young as 6 years of age.[4]

The following conditions often occur with dyslexia in the same individual. It is unclear whether these conditions share underlying neurological causes with dyslexia.

- Dysgraphia is a disorder which expresses itself primarily during writing or typing, although in some cases it may also affect eye-hand coordination in such direction or sequence oriented processes as tying knots or carrying out a repetitive task. Dysgraphia is distinct from Dyspraxia in that the person may have the word to be written or the proper order of steps in mind clearly, but carries the sequence out in the wrong order.[7]
- Dyscalculia is a neurological condition characterized by a problem with learning fundamentals and one or more of the basic numerical skills. Often people with this condition can understand very complex mathematical concepts and principles but have difficulty processing formulas and even basic addition and subtraction.[8]
- Developmental dyspraxia is a neurological condition characterized by a marked difficulty in carrying out

routine tasks involving balance, fine-motor control, kinesthetic coordination, difficulty in the use of speech sounds, problems with short term memory and organization are typical of dyspraxics.[9]

- Specific Language Impairment is a developmental language disorder that can affect both expressive and receptive language. SLI is defined as a "pure" language impairment, meaning that is not related to or caused by other developmental disorders, hearing loss or acquired brain injury. speech perception. The findings indicate that both dyslexia and SLI can be explained by a multi-risk model which includes cognitive processes as well as genetic factors.[10]
- Cluttering is a speech fluency disorder involving both the rate and rhythm of speech, and resulting in impaired speech intelligibility.[11] Speech is erratic and dysrhythmic, consisting of rapid and jerky spurts that usually involve faulty phrasing. The personality of the clutterer bears striking resemblance to the personalities of those with learning disabilities.

Exacerbating conditions

Dyslexia is believed to be a neurological condition that influences the individual's ability to read and spell written language.[12] The following conditions may be contributory or overlapping factors, similar to dyslexia as they can lead to difficulty reading

- Auditory processing disorder is a condition that affects the ability to process auditory information. Auditory Processing Disorder is a Listening Disability. It can lead to problems with auditory memory and auditory sequencing. Many people with dyslexia have auditory processing problems including history of auditory reversals, and may develop their own Logographic cues to compensate for this type of deficit. Auditory processing disorder is recognized as one of the major causes of dyslexia[13]. Some children can acquire auditory processing disorder as a result of experiencing otitis media with effusion (Glue Ear, Sticky Ear, Grommits) and other severe ear conditions.
- Scotopic sensitivity syndrome, also known as Irlen Syndrome, is a term used to describe sensitivity to certain wavelengths of light which interfere with visual processing, Attention deficit hyperactivity disorder occurs in between 12% and 24% of those with dyslexia.[14]

There are three proposed cognitive subtypes of dyslexia (auditory, visual and attentional), although individual cases of dyslexia are better explained by specific underlying neuropsychological deficits and co-occurring learning disabilities (e.g. attention-deficit/hyperactivity disorder, math disability, etc.). Reading disability, or dyslexia, is the most common learning disability.[12] Although it is considered to be a receptive language-based learning disability in the research literature, dyslexia also affects one's expressive language skills. Adult dyslexics can read with good comprehension, but they tend to read more slowly than non-dyslexics and perform more poorly at spelling and nonsense word reading, a measure of phonological awareness. Dyslexia and IQ are not interrelated as a result of cognition developing independently.[8]

The National Institute of Neurological Disorders and Stroke gives the following definition for dyslexia

"Dyslexia is a brain-based type of learning disability that specifically impairs a person's ability to read. These individuals typically read at levels significantly lower than expected despite having normal intelligence. Although the disorder varies from person to person, common characteristics among people with dyslexia are difficulty with spelling, phonological processing (the manipulation of sounds), and/or rapid visual-verbal responding. In adults, dyslexia usually occurs after a brain injury or in the context of dementia. It can also be inherited in some families and recent studies have identified a number of genes that may predispose an individual to developing dyslexia."[12]

Dyslexia is the name given to a condition which causes difficulty in reading and writing, the letters and numbers appear jumbled or reversed. Letters such as 'b' or 'd' are confused and others are transposed, meaning dyslexics read or write 'pest' for 'step'.

Many of the symptoms that are commonly associated with dyslexia can also be the result of vision problems. Vision therapy addresses problems that result from weaknesses in eye muscles or other problems in the way the eyes are used, through a series of exercises and skill-building sessions, or with physical devices such as special lenses.[4] Two common examples of problems that can be addressed with vision therapy are tracking or convergence problems. 'Tracking' means that

an individual is not able to use her eyes to scan the text left-to-right. 'Convergence' or 'teaming' means that the two eyes are not working together properly, so that the person may see double, or may lack binocular vision. It is very possible for a person to have both dyslexia and vision problems that can be addressed with vision therapy. Advice and evaluation concerning vision therapy should be obtained from a Developmental Optometrist.[13]

Dyslexia is not a disease, and thus medication will not cure a person with dyslexia, nor will it help with the dyslexia itself. Rather, dyslexia is the result of a different style of thinking and learning, and is best addressed through educational counseling or tutoring. Sometimes individuals find that certain medications can help with some symptoms of dyslexia. For example, medicines might help a person stay focused or handle headaches or nausea experienced with reading.[10] However, this approach does nothing to help the underlying learning problems. Most prescription medicines have potentially dangerous side effects, and use of medication to treat symptoms could lead to long-term dependency.[7] Unfortunately, some people mistake the alleviating of symptoms for a cure, and for that reason promote the use of medications to treat learning difficulties.

The concept of interactive processing that involves two parallel, segregated visual pathways, the transient and sustained processing systems. Evidence that deficits in the transient, but not the sustained system, interfere with the reading process is examined.[2] After tracing these pathways from the retina to the visual cortex, and beyond, special attention is given to the mechanism of the dual processing system in reading, the synchronization of these two systems, and the effects of poor timing on visual processing and reading.

The finding could lead to methods of detecting dyslexia in infancy, and treatments could begin in very early childhood when the brain's circuitry is most capable of changing. Initial standardized reading comprehension test scores significantly differentiated good from poor readers.[6] Using reading selection levels consonant with each subject's ability, no significant differences were measured in baseline comprehension scores between good and poor readers. In normal readers, the flickering background increased the latency and reduced the amplitude of the early components, whereas in the reading-disabled children only the amplitude was affected. No differences were observed in either group with the high-spatial-frequency target.[15]

CONCLUSIONS

This study confirms a link between wavelength of light, luminance, and reading performance with dyslexia. With appropriate instruction, at-risk readers can become both accurate and fluent readers. It is highly recommended that at first point of concern when a teacher or parents notices a child experiencing persistant and unexpected difficulties learning to read at grade level that they are screened and that a plan of action is devised that suits her or his learning, give special attention and care. In contrast, although intensive, evidence-based remedial interventions can markedly improve reading accuracy in older, reading-disabled children, they have been significantly less effective in closing the fluency gap. Owing to the dynamic course of language development and the changes in language demands over time, even after a child has demonstrated a substantial response to treatment interventions, his or her subsequent progress should be carefully tracked to ensure optimal progress to words the development of reading and written language skills. These relatively recent investigations give strong support for the validity of the concept of developmental dyslexia along with evidence of its neurobiological basis. The results are impressive, not least in revealing dysfunctions in areas where one would expect to find them; in brain regions known to be involved with language generally and with phonological processes in particular. Such dysfunctions appear to be present from an early age, at least from the period of learning to read, yet they have proved to be amenable in some degree to modification with training. This reinforces the importance of identifying vulnerable children at the earliest opportunity and engaging them in appropriate remediation.

REFERENCES

1. A dyslexia definition from a varity of reference orginisation by Michael Bates www.dyslexia-reading-well.com.
2. The effect of varing luminance and wavelength on reading disabilities by S Blakeslee. www.callbpi.com/support/dyslexia.htm
3. Temple E, Deutsch GK and Poldrack RA. Neural deficits in children with dyslexia ameliorated by behavioral remediation: evidence from functional MRI. Sci USA. 2003;100:2860–5.

4. Rocky mountain learning system of reading and writing. www.rmlearning.com/dyslexia.htm.
5. Stein J and Talcott J. Tlie magnocellular theoiy of developmental dyslexia. Dyslexia 1999;5:59-62.
6. Paulesu E, Démonet JF and Fazio F. Dyslexia: cultural diversity and biological unity science. 2001;291:2165–7.
7. Dyslexia-Wikipedia the free encyclopedia en.wikipedia.org/wiki/Dyslexia
8. Signs and symptoms of learning Disorders-Brain Balance by Jeena smith. www.brainbalancecenters.com.
9. Language disorder -children :medicineplus medical Encyclopedia www.nlm.nih.gov.
10. Harm MW and Seidenberg MS. Are there orthographic inipainnents in phonological dyslexia.Cogn Neuropsychology. 2001;18:71-92.
11. MIND cognitive aspects of language - Reading disability.www.dys-add.com/dyslexia.html.
12. Central auditory processing disorder by Age group Auditory Processing Disorders. www.additudemag.com
13. NAMI IOWA Children's Mental Health Resources - Keystone Area .../NAMIIOWAchildrensmentalhealthresou.
14. Transient and sustained processing: effects of varying luminance ... www.ncbi.nlm.nih.gov.
15. A Defective Visual Pathway in Children with Reading Disability www.dislexiadeleitura.com.