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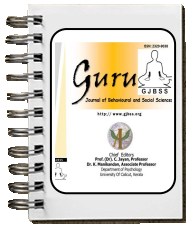

Sensory Motor Integration of Children with Dyslexia

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Abstract

Dyslexia is a word that is often used for poor reading ability. Dyslexia can be used to specify a reading disability associated with an inability to translate written language to speech. Poor motor skills are known to frequently co-occur with dyslexia.Dyslexia was regarded to be related to problems with motor development and coordination. The objective of the study is to assess the Sensory motor coordination ability of dyslexic groups and non dyslexic groups.The methodology used for the study is systematic sampling. Sample for the research consist of 64 students from various schools in Kottayam district. There are 32 subjects identified as dyslexia and 32 as matched non dyslexic. They were administered Standard progressive metrics, one minute reading, rapid naming , two minute spelling, based on the IQ test include the average IQ scored students for the further tests. The matched control subjects selected for the study based on the IQ test, average score in one minute reading, rapid naming , two minute spelling. And finally administered QNST (Quick Neurological Screening Test).The study revealed that dyslexic students have difficulties in sensory motor coordination abilities based on 14 subtests of QNST.

The dyslexic child may not learn to read easily and may not be able to write the words that he /she hears. These difficulties in converting written material to speech and spoken words to writing are the essential characteristics of dyslexia (Das 2009).Disabilities in fine motor skills are more often associated with dyspraxia than with dyslexia. Dyslexic people, who have not been diagnosed with dyspraxia, may also have non neurological problems with fine motor skills. Hand eye coordination is what we use to control a pen, knife and fork or a pair of scissors. Some dyslexic children find these skills hard to master (Janet 2000).

It is widely acknowledged that a significant number of children experience major difficulties in learning to read, while prevalence rates vary. Many reports suggest that dyslexic children constitute around 5%of the school population (Snowling 2000).

Stein (2001) argues that there is genetic sensory, motor and psychological evidence that dyslexia is a neurological syndrome affecting the development of the brain. He also provides evidence that the development of magnocellular neurons is impaired in children with dyslexia.The genetic theory of dyslexia begin when researchers observed that it runs in families. In addition to the difficulties in reading, spelling, maths, and comprehensive abilities they are also having problems in the areas of memory, Meta cognition, executive functions due to their processing difficulties and perceptual problems.

Objective

1. To studythe Sensory motor integration of dyslexic students and non dyslexic students.

Hypotheses

1. There is no significant relationship between dyslexic and non dyslexic students in sensory motor integration.

Method

Participants

The methodology used for the study is systematic sampling. Sample for the research consist of 64 students from various schools in Kottayam district. There are 32 subjects identified

as dyslexia and 32 as matched non dyslexic. Among them, there are 16 females and 16 males with dyslexia and 16 males and females without dyslexia between the age group of 12 to 13. Sample of 32 students with dyslexia were selected studying in the 8th and 9thstandards English medium state syllabus. They were administered Standard progressive metrics, one minute reading, rapid naming, two minute spelling, based on the IQ test scores of the students include the average IQ scored students for the further tests. The matched control subjects selected for the study based on the IQ test, average score in one minute reading, rapid naming, two minute spelling.And finally administered QNST (Quick Neurological Screening Test).

Instruments

1. Standard Progressive Metrics (Ravens, 1938): This test is suitable for comparing people with respect to their immediate capacities for observation and clear thinking. The mill hill vocabulary scale is designed to complement the SPM by assessing a person's capacity at the time of the test to apprehend meaningless figures presented for this observation the scale consist of 60problems divided 5 sets each sets have 12 question figures. In each set the first problems is as nearly as possible self-evident. The problem which follow become progressively more difficult. The order of the item provides the standard training in the method of working the five set provide five opportunity for grasping the method and five progressive assessment of a person's capacity for intellectual ability, SPM was designed to cover the widest possible range of mental ability and to be equally useful with person of all ages, whatever their education.
2. Rapid naming test (Wolf, 1999): This is tested here by getting them to name a series of outline pictures on a card. Turn to card one, quickly go through the names of each picture in the top half, show the child the pointing to the first picture and moving finger along the line from left to right until reach the last picture in the top half. Add 5 seconds to the time taken for each mistake made. Add an additional 10 seconds to the time if it has necessary to the time if it has to use the lose place card. Record the time in seconds.
   a) One minute reading

      Reading ability is assessed in terms of the subject ability to read single words within one minute (Anjala 2004). Reading disability or dyslexia may range from spelling errors, difficulty in reading single words, reading comprehension and deficit in phonological processing.One minute reading sheet is given to the subject. Which consist of certain words range from simple to complex. Ask the child to read aloud a page of individual words start at the top and read as fast as you can in a minute without making mistake. One mark for each word read correctly subtract the errors and passes from the total number read to get the score. If the child reads the complete sheet in less than one minute add 2 point for each second less than 60.

   b) Two minute spelling

      Spelling test is used to assess speed as well as accuracy of spelling. The test also involve speed of writing, the reason is that dyslexic children often have very poor spelling, which is usually worse than their reading.Some words are given to the subject one by one, starting to detect the next when the child finishes writing the previous one. One mark per correct spelling.

   c) Quick neurological screening test

      The Quick Neurological Screening Test (QNST) consists of 15 observed tasks that help identified as young as five years old, who have learning disabilities. The QNST is primarily intended for use by trained psychologist and other personal as a screening devise for early identification of children with learning disabilities, it has been demonstrated to be very effective with adolescents and adults who have learning problems. These tasks provide the opportunity to sample in an organised and orderly

way a child's maturity of motor development skill in controlling large and small muscles, motor planning and sequencing, sense of rate and rhythm, spatial organization, visual and auditory perceptual skills, balance and cerebellar-vestibular function, and disorders of attention. The test is useful for screening purposes in that indicates possible deficit areas; however, it does not label a child as neurologically handicapped, nor does it diagnose brain dysfunction or damage.

Result and Discussion

The aim of the study is to assess sensory motor coordination ability of dyslexic children. The sample comprises of 32 dyslexic and 32 non dyslexic children.

Table 1

Mean, Sd and't' value of various study variable of Sensory motor Coordination ability of dyslexic groups and non dyslexic groups

Variables	Groups	N	Mean	SD	't' value
Hand skill	Dyslexic	32	1.78	.832	9.202**
	Non Dyslexic	32	.25	.440	
Figure recognition & production	Dyslexic	32	2.38	.629	6.107**
	Non Dyslexic	32	1.44	.504	
Palm form recognition	Dyslexic	32	1.91	.856	0.79
	Non Dyslexic	32	1.75	.718	
Eye tracking	Dyslexic	32	.31	.471	3.99**
	Non Dyslexic	32	1.25	1.244	
Sound patterns	Dyslexic	32	3.03	.782	4.23**
	Non Dyslexic	32	1.72	1.571	
Finger to nose	Dyslexic	32	.75	.508	4.116**
	Non Dyslexic	32	1.97	1.596	
Thumb &finger circle	Dyslexic	32	1.00	.718	6.241**
	Non Dyslexic	32	.13	.336	
double simultaneous of hand &cheek	Dyslexic	32	.22	.420	2.946**
	Non Dyslexic	32	.00	.000	
Rapidly reversing repetitive hand movements	Dyslexic	32	.31	.471	3.754**
	Non Dyslexic	32	.00	.000	
Arm &leg extension	Dyslexic	32	2.72	.888	6.336**
	Non Dyslexic	32	.91	1.353	
Tandem walk	Dyslexic	32	1.94	1.076	7.304**
	Non Dyslexic	32	.41	.499	
Stand on one leg	Dyslexic	32	1.50	.622	9.280**
	Non Dyslexic	32	.25	.440	
Skip	Dyslexic	32	.56	.801	2.60*
	Non Dyslexic	32	.16	.369	
Left right discrimination	Dyslexic	32	1.03	.782	7.456**
	Non Dyslexic	32	.00	.000	
Behavioural irregularities	Dyslexic	32	.00	.000	0.00
	Non Dyslexic	32	.00	.000	

*p< .05, **p< .01

Table 1 indicates there is significant difference in study variables, such as handskill, figure recognition and production, eye tracking, sound patterns, finger to nose thumb and

finger circle, double simultaneous of hand &cheek,rapidly reversing repetitive hand movements, arm and leg extension, tandem walks, stand on one leg skip, left right discrimination, between dyslexic groups and non dyslexic groups. It also indicates that mean score of hand skill of dyslexic groups is 1.78, the t value obtained is 9.202 , which is statistically significant at p(0.01 or 0.05), dyslexic children have problem while using hand related task.

The t value of figure recognition and production of dyslexic groups is 6.107, which is statistically significant at p (0.01 or 0.05), dyslexic children have problem visual discrimination, perception, eye hand skill, fine motor task . The mean score dyslexic is 2.38, and the mean score of non dyslexic children is 1.44.

The t value obtained in palm and fingercircle is .791. that mean there is no significant difference between dyslexic and control children in palm form recognition.The mean score of Eye tracking of dyslexic children .31 and non dyslexic is 1.25, the 't'value3.98 obtained is statistically significant p<0.01 0r 0.05>. Thus the eye tracking ability of dyslexic children andnon dyslexicchildren have significantly different. Eye tracking is necessary for smooth reading, dyslexic children have poor in eye tracking ability than non dyslexic children.Eye tracking means visual acuity, visual attention, extra ocular muscle resting balance, control of movement, visual motor coordination.

The t value of sound patterns of dyslexic groups is, obtained is 4.232 , which is statistically significant at p(0.01 or 0.05), dyslexic children have problem in auditory discrimination, perception, auditory attention skill, auditory motor planning . The mean score dyslexic is 3.03, and the mean score of non dyslexic children is 1.72. The finger to nose ability of dyslexic children andnon-dyslexicchildren have differ significant, dyslexic children have poor in finger to nose ability than non dyslexic children. A normal score in finger to nose indicates that the children have motor maturity, motor planning, proprioception and kinaesthetic sense. The t value of thumb and finger circle of dyslexic groups is 6.241, which is statistically significant at p (0.01 or 0.05), dyslexic children have problem in motion perception discrimination, motor planning fine control of small muscles . The mean score dyslexic is 1.00, and the mean score of non dyslexic children is .13.

The t value of double simultaneous of hand and cheek is 2.946 which is statistically significant at p(0.01 or 0.05), this mean that the dyslexic children significantly differ in the double simultaneous of hand and cheek. The mean score of dyslexic children is .22 and non dyslexic children is .00, this indicates that dyslexic children have problem in tactile sensation, two point awareness motion perception discrimination, motor planning fine control of small muscles .

The mean score of rapidly reversing repetitive hand movements of dyslexic children and non dyslexic children are .31, and .00 respectively. The 't'value of RRRHM (Rapidly reversing repetitive hand movements) is 3.75, that is statistically significant p<0.01 or 0.05>. Thus the rapidly reversing repetitive hand movement's ability of dyslexic children and non dyslexic children are differ significantly. Rapidly reversing repetitive hand movements represent motor maturity, motor planning, and fine control of large and small muscles: smoothness, rhythm, sequence, symmetry, and left right difference.

The t value of arm and leg extension obtained is 6.33 which is statistically significant at p(0.01 or 0.05), this mean that the dyslexic children significantly differ in the arm and leg extension .The mean score of dyslexic children is 2.72 and non dyslexic children is .91, this indicates that dyslexic children have problem in motor maturity and motor planning, poor balance, fine control of small muscles. In the study variable tandem walk, the mean score of dyslexic children andnon-dyslexic are 1.94, and .41 respectively, the t value obtained is 7.304 it indicate that dyslexic children and non dyslexic are differ significantly in tandem walk(heel toe walk). Normal score in tandem walk indicates that children have motor maturity, motor

planning, fine control of large muscles also proprioceptive and kinaesthetic sense such as body balance, strength, body space.

In the study variable stand on one leg mean scores are 1.50 in dyslexic children and .25 in non dyslexic, it mean dyslexic children and non dyslexic are significantly differ in stand on one leg, the t value is 9.280, dyslexic children have most difficult to stand on one leg than non dyslexic, inadequate motor maturity, and motor planning are the indicates of high score in stand on one leg, also they have poor balance.The t value of left right discrimination in hand, eye foot obtained is 2.607 which is statistically significant at p(0.01 or 0.05), this mean that the dyslexic children significantly differ in the skip.The mean score of dyslexic children is .56 and non dyslexic children is .16, this indicates that dyslexic children have problem in motor maturity and motor planning, poor balance, fine control of small muscles.

In the study variable, the mean score of dyslexic children and non dyslexic are 1.03, and .00 respectively, the t value obtained is 7.456, it indicate that dyslexic children and non dyslexic are differ significantly in left right discrimination and hand eye foot preference. High score indicates that children have poor motor maturity, motor planning, and difficulty to discriminate left right.

Hand, eye, and foot preference are significant in classroom performance if the student is using the less skilful side. Study reveal that dyslexic children struggle with the balancing task when they are given a second task at the same time to stop them from concentrating on the balancing activity (Nicolson, 1990).

Conclusion

The study is to find out the sensory motor coordination ability functions of dyslexic children. The study revealed that dyslexic students have difficulties in sensory motor coordination abilities based on 14 subtests of QNST. There is significance different between dyslexicgroups and control groupin sensory motor coordination ability. The study sensory motor coordination ability with reading difficulties is an attempt to reveal the mysterious of dyslexia. Sensory motor coordination problems co occurs not with dyslexia but also dyspraxia, dyscalculia, dysgraphia etc. so that the problem children have faced many academiccompetencies, and low psychological wellbeing. That affects the overall performance of a child. Many study revealed that sensory motor coordination ability deficits is an important aspect in dyslexic children this knowledge can be used for an early identification of children at risk of dyslexia before they meet the criteria for learning disabilities. One advantage of such early identification would be the opportunity toapply focusedprevention programs to them,which might reduce the other complications of the learning disability.

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