Development of a Screener to Identify Specific Learning disability

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Abstract

Learning disabilities are neurological-based processing difficulties. These processing difficulties can interfere with learning basic skills such as reading, writing and/or arithmetic which can also interfere with higher level skills such as organization, temporal planning, abstract reasoning, long or short-term memory and attention. According to the National Institutes of Health (NIH), fifteen percent of the U.S. population, or one in, seven individuals have some type of learning disability. These disorders are heterogenous in nature and are caused due to central nervous system dysfunction. Learning disability may occur concomitantly with other impairments (e.g., sensory impairment, mental retardation, social and emotional disturbance) or environmental influences (e.g., cultural differences, insufficient/inappropriate instruction, psychogenic factors). Learning disability is a longstanding condition hence early detection and immediate intervention plays a very important role. This study aims in developing a screener which could be administered by the teachers to delineate the imperiled targets of learning disability at a very early stage.

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1. Introduction

Learning disabilities are a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities (Hammil D 1987) The conditions like dyslexia, dysgraphia, auditory processing deficits, language processing disorder, nonverbal learning disabilities and visual motor difficulties are associated with Learning disability (Learning Disabilities Association of America, n.d.). A study was done to evaluate whether the level of a spinal lesion is associated with variations in anomalous brain development and neurobehavioral outcomes in children suffering from the meningomyelocele form of spinal bifida and hydrocephalus (SBM-H). The results revealed that a higher level of spinal lesion in SBM-H is a marker for more severe anomalous brain development, which is in turn associated with poorer neurobehavioral outcomes in a wide variety of domains that determine levels of independent functioning for these children at home and school (Fletcher, 2005). A study was performed to examine learning disabilities among low birth weight (<1500 g) and also to document the possible sex differences in the effect of low birth weight and assessed risk across the entire range of low birth weight. The effect of low birth weight on learning disabilities appears to be specific to male children. Although this sex-specific effect is consistent with previous findings of a greater vulnerability of male children to pregnancy and birth complications, it remains to be replicated and clarified (Johnson, 2000). Dyslexia is a specific learning disability that is neurological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede the growth of vocabulary and background knowledge (International Dyslexia Association, 2015). Functional imaging studies have shown reduced regional cerebral blood flow (rCBF) in temporal and inferior parietal regions and lesions in left angular gyrus causes dyslexia (Rumsey, 1999). Dysgraphia is a writing disability in which a person finds it difficult to form letters or write within a defined space. The demand to combine the complex mixture of tasks needed for a satisfactory written result may be difficult which is manifested by difficulties with spelling, Poor handwriting, trouble establishing thoughts and poor organization of writing on the page. Many studies have been attempted to discern the site of lesion for dysgraphia which was found to be in the left hemisphere (predominantly the left parietal and the left temporo parietal regions) (Balasubramanian, 2005). Auditory processing deficit or the Central

Auditory processing deficit is defined as impaired ability to process the auditory signal in the presence of a normal peripheral hearing (ASHA Taskforce 2002). A study was done to tap on the behavioral discrimination skills of the speech stimuli and to correlate it with diminished magnitude of an electrophysiologic measure that is not dependent on attention or a voluntary response which revealed that children with learning disability had significant difficulty in discriminating rapid acoustic changes that occur in speech and results indicate that discrimination deficits originate in the auditory pathway before conscious perception (Kraus, 1996). According to the National Survey of Children's Health(NSCH) the estimate for current learning disabilities among children of ages 3–17 years in 2007 was 7.8 percent, with 3.7 percent rated as mild and 4.0 percent rated as moderate or severe. The estimate for learning disabilities in 2011–2012 was 8.0 percent for children of ages 3–17, with 4 percent rated as mild and 4 percent rated as moderate or severe (National Academies Press(US), 2015). Statistics Canada reports in 2006 Participation and Activity Limitation Survey (PALS), measuring the prevalence of learning disabilities among Canadian children and adults which revealed more children in Canada to have a learning disability than all other types of disabilities combined. Among the children with disabilities in this country, more than half (59.8%) have a learning disability (Learning Disability Association in Canada). A prevalence study on learning disability was done by Nayana Mariya Kuriyan, & Justine K James which revealed 10% of children in India had learning disability and have delayed access to early identification and intervention (Kuriyan 2018). There are several Western tools like Language Awareness in reading readiness test (LARR), Dyslexia Screening Test-Junior (DST),Wechsler Individual Achievement Test III and Indian Tools like Early Literacy Screening Tool (ELST), Dyslexia Assessment Profile for Indian Children (DAPIC), Dyslexia Assessment for Languages of India (DALI) are available to identify the children who are at risk of Learning Disability. It includes comprehensive screening and assessment procedures to identify various Learning, reading, and writing deficits which could be administered by various professionals like Speech Language Pathologist and Psychologist. Most of the tools that are currently used in the screening and assessment of Specific Learning Disability are developed and validated for children from other countries and could only be administered by Health Care Professionals. Teachers are professionals who play a very important role in identifying the children who exhibit symptoms of Specific Learning Disability during the Language acquisition stage. The screener that is developed in this study will contain 15 statements which is the common red alert signs and symptoms exhibited by children when they have characteristics of Specific Learning Disability which could be

administered by the teachers to facilitate Early Identification. Thus, this study aims to develop a screener to identify children who are at risk of Specific Learning Disability which could be administered by the subject teachers handling them.

The aim of this study is to develop a screener to identify Specific Learning Disability for the teachers handling the children.

2. Methodology

1.1.   Participants

The participants to this study are 531 children between the age range 6-10 years with normal sensory motor development. Children with developmental anomalies were excluded from the study. The screener was administered by 45 teachers, who completed their teacher training program (B Ed), to the primary class children they taught.

1.2.   Data collection and processing

A self -rating screener was prepared for the teachers. This screener consisted of a set of 15 highlighting aspects to identify the children at risk of Specific Learning Disability which was based on the Diagnostic statistical Manual for Mental Disorders (DSM V) criteria for diagnosing the Specific Learning disability and World Health Organization (WHO). Content validation of the questionnaire was done by four Speech language pathologists and a psychologist. The data was collected from Government aided schools with State board syllabus and English as their mode of instruction and the children belonged to the upper and lower middle-class families. Dyslexia Assessment Profile for Indian Children (DAPIC) was administered to correlate the findings of the screener and to document the child's reading and writing abilities at alphabet, word and sentence level for children who obtained a score of 15 and above in the screener administered by the teacher. Counseling was given to the parents of children who had the score of above 15 regarding Learning disability and the management options available for treating the same based on the performance of the various subtest in the DAPIC and the behaviors exhibited in the class as marked by the teacher in the screener.

1.3.   Data analysis

Statistical analysis was performed using the SPSS software version 20. Cronbach's alpha test was administered to judge the internal consistency and the overall reliability of the screener.

3. Findings

Data accumulated from children between the age range of 6-10 years. The teachers were given the screener to administer on each child and the scores were obtained. The results revealed that on administering the screener, 81.35% (n=432) of the children were not at the risk of Specific Learning Disability and 18.64% (n=99) of the children were at the risk of getting Specific Learning Disability. Out of the 99 children 72.72% (n=72) of them were at Mild risk of Specific Learning Disability and 21.21% (n=21) of them

were at moderate risk of Specific Learning Disability and 6.06% (n=6) of them are at severe risk of Specific Learning Disability.

The overall reliability of the screener is 0.98 which indicates that the screener has very high accuracy.

Table 1
The Internal consistency of the screener

Items	Total correlation
Poor eye contact	.730
Following steps/commands	.749
Day dreaming, inappropriate word usage	.714
Sitting aloof	.634
Talent in Non -Academic areas	.229
Reversal/Jumbling of letters	.861
Effortful reading	.887
Difficulty with multi syllabic words	.894
Difficulty with reading and following lines	.778
Difficulty with sounds to letter association	.884
Difficulty remembering	.845
Poor age matched performance	.731
Illegible handwriting	.850
Difficulty copying from the board	.832
Difficulty with mathematics	.838

Table 1 shows the Internal consistency of the screener which reveals that the screener has acceptable correlation for the contents including the child's maintenance of poor eye contact (.730), inability of the child to follow steps or commands given by the teacher (.749), tendency of the child to day dream and use inappropriate words to answer (.714), difficulty of the child to follow lines and read (.778) and substantially poor age matched performance which causes problems in school and every day work (.731). The screener has good correlation for the contents including the child's nature of jumbling the letters while writing in the notebook or board (.861), slow, inaccurate and effortful reading that is exhibited by the child (.887), difficulty to produce multisyllabic words and the increased frequency of mispronouncing those words (.894), difficulty to associate sounds to letters and connecting them (.884), difficulty in remembering what the parent or the teachers say (.845). Good correlation was also obtained for the aspects regarding the illegible handwriting portrayed by the child which makes it difficult for the teacher to correct (.850), difficulty faced to copy from the board (.832) and the perplexity to solve simple mathematical problems (.838). Questionable correlation was seen for the content of the child's nature to sit aloof in the class (.634) and poor correlation was seen for the child's tendency to be extremely talented in other non-academic domains (.229)

4. Conclusion

According to theories of Language Acquisition there is an interplay of organic and in-organic factors that is responsible for the acquisition of language.

Similarly, learning is the process of acquisition of knowledge or skills which occurs due to the interaction of multifactorial component from a very early age. Elements that hinder the process of acquiring the language might range from various significant components that is concerned to the child or the surrounding in which the child develops. Functionally, a disability will hamper the competence and the performance of the child in the acquiring language. This screener is developed as a potential solution to facilitate Early Identification in children who are at risk for Specific Learning Disability by the teachers. Teachers should be provided with sufficient training regarding the signs and symptoms of identifying Specific Learning Disability, management options available for treating the condition and the strategies that could be implemented to overcome the hurdles that are present to teach children with Specific Learning Disability. Parental contribution in learning as well as motivating the child plays a vital role in improving the child's knowledge of learning concepts. The effective usage of this screener with good validity will help the teachers in the delineation of the children who are at risk for Specific Learning Disability. This will promote and encourage the holistic learning of various concepts, competence and performance in the language acquiring and will improve the overall quality of life.

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Appendices

Appendix I
Introduction:
This screener is administered to assess risk for Specific Learning Disability. This screening tool was prepared on the guidelines based on the Diagnostic statistical Manual for Mental Disorders (DSM V) criteria for diagnosing the Specific Learning disability and WorldHealthOrganization(WHO).This screener will consist of 15 statements which should be scored by the teacher on a Likert scale of 5. This will be administered within 5-6 minutes and will help the teachers in identifying the children who are at risk of Specific Learning Disability. This will further help in early detection & early intervention.

Instructions to Teachers:
• Step 1: Fill in the demographic data.
• Step 2: Read the statements carefully and provide appropriate ratings considering the child.
• Step 3: Total the scores obtained from the rating.
• Step 4: If the child falls under substantial risk then inform the parents and the higher authorities and refer for a detailed evaluation.

Scoring:
• 46-60: Severe risk-The child has to be sent for detailed evaluation and complete support and modification of the syllabus might be required. Counseling the parents regarding the child's conditions and the acceptance to improve the child as a whole.
• 31-45: Moderate risk-The child has to be sent for a detailed evaluation and substantial support has to be given at the domains the child lacks excellence. Regular follow up to be given to check for the progress.
• 15-30: Mild risk-The child is at mild risk for getting a specific learning disability. Attention has to be given to the child by the teachers and parents. Follow up to be given if necessary.
• Below 14: No risk- No further action required unless surveillance indicates risk for Specific Learning Disability.

Appendix II

Demographic Data

Name   :

Age / Gender   :

Standard   :

Fathers Name   :   Contact Number
:

Mothers Name   :   Contact Number
:

Mother Tongue   :

Medium Of Instruction   :

Academic Performance   :

Appendix III

Specific Learning Disability Screener

This screening tool has to be administered for children within the age range 6-10 years by the teachers who are handling them.

Time taken to administer: 5-6 minutes

Statements	Always (4)	Mostly(3)	Frequently(2)	Sometimes(1)	Rarely(0)
1. The child has poor sitting tolerance, eye contact and inattentive in class.					
2. The child has difficulty in following steps or commands given by the teacher.					
3. The child seems to be day dreaming and answers using inappropriate words.					
4. The child prefers to sit aloof.					
5. The child is extremely talented in one non-academic area.					
6. There is reversals and jumbling of letters and numbers seen in the notebooks or in the board.					
7. Slow, Inaccurate and effortful reading is seen in the child.					
8. The child has trouble producing multi-syllabic words and often mispronounces the words.					
9. The child has difficulty in reading and following the lines.					
10. The child has difficulty in Matching sounds to letters and trouble connecting letter and sounds.					
11. The child has difficulty in remembering what the teacher/ parent says.					
12. The child has academic skills that are substantially below what is expected for the child's age which causes problems in school, work and /or every day activities.					
13. The child's handwriting is illegible and difficulty while correcting the child's classwork.					
14. The child has difficulty in copying from the board.					
15. The child has difficulty in solving simple mathematical problems.					