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Learning Disabilities in Children: Epidemiology, Risk Factors and Importance of Early Intervention

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Abstract

Children with learning disabilities have significant impairment in reading, writing and mathematics, in spite of normal intelligence and sensory abilities. In reading disability, children will have difficulties in phonemic sensitivity, phonetic decoding, word recognition, word decoding skills and reading comprehension. The lifetime prevalence of learning disability is about 10%. Learning disabilities are more frequently seen in boys compared to girls. There are several risk factors for learning disabilities. Low birth weight, preterm birth, neonatal complications, language delay and epilepsy are important risk factors for learning disabilities in children. Students with learning disabilities have poor scholastic performance, anxiety and significant stress. They have more social, emotional and behavioural problems than those without learning problems. If not remedied at the earliest, learning disabilities will lead to failure in exams and these children may develop stress related disorders. Hence all children with learning problems should be evaluated scientifically at the earliest, for identification of learning disability. By providing scientific guidance and intensive one to one remedial training, learning problems of children can be managed successfully.

Keywords: Learning Disability, Children, Epidemiology, Risk Factors, Early Intervention

Introduction

Learning disabilities are developmental disorders characterized by severe difficulties in reading, writing or performing arithmetical calculations, in spite of adequate instruction, intact hearing and vision as well as social opportunity [1]. The difficulty in learning is not due to intellectual deficit, emotional disturbance or cultural difference [2]. They have normal intelligence and sensory abilities.

Specific reading disability or developmental dyslexia is a disorder in which children have significant and persistent deficits for reading [3,4]. Reading skills develop only with direct instruction. Phonemic sensitivity, phonetic decoding, word recognition, word decoding skills and reading comprehension develop in stages. If the initial skill is not developed, further skills will not develop without scientific remedial training [5].

The school grades of children with learning disabilities will be low and are not comparable with

their intelligence [6]. Early diagnosis and individualized remedial training are necessary to manage the learning problems of children. Parental guidance is essential in the diagnosis and therapy of these children [7].

Several research studies relating to learning disabilities have been conducted in countries all over the world. The research studies have reported the epidemiology, risk factors and importance of early intervention. In India also many researches were done on children with learning disabilities and standardized tools have been developed for assessment and remediation [8].

Epidemiology

Learning disabilities are common among children. 12.97 per cent of rural primary school children having IQ greater than or equal to 90 were found to have poor academic achievement [9]. Studies conducted to determine the prevalence of learning disabilities have reported prevalence rate ranging from 3-10 per cent among students of India. 1.58 per cent of 12 to 18 year old school students, had specific learning disability in a study conducted in Chandigarh. In this study, the prevalence rate was low due to non-availability of standardized tests in vernacular language [10]. The lifetime prevalence of learning disability was 9.7% in children of United States of America. Learning disability is considered as a significant morbidity in average-developing children [11].

In a study to assess the prevalence of learning disabilities in 3rd and 4th grade students of government schools in a northern city of India, 33.6% of children were identified by teachers as at-risk students. 3.08% of students were confirmed as having learning disability [12]. Shaywitz BA et al reported that reading disability or dyslexia is the most common of the learning disabilities and represents a disorder of cognitive functioning [13]. Shaywitz SE also reported that dyslexia is the most common type of learning disability seen in children [14]. There is strong evidence that Chinese, Japanese and American children have reading disability. But there are differences in the incidence of reading disability in Western and Asian languages and this difference is related to orthographic factors [15].

The incidence rates of reading disability in school children varied between 5.3% to 11.8% [16]. Reading disability was clearly more frequent in boys than in girls [17]. Four independent epidemiological studies have proved that the rates of reading disability are significantly higher in boys compared to girls [18]. Boys and girls were differentially susceptible to risk factors in reading disability. The biologic factors leading to reading disability were different among boys and girls [19].

Study by Mayes SD et al found that disorder of written expression is more common than reading disability and mathematics disability [20]. Katusic SK et al found that disorder of written expression is almost as frequent as reading disability, in the population-based birth cohort of school-aged children. Disorder of written expression was seen 2 to 3 times more in boys compared to girls [21]. Boys were consistently more impaired than girls in orthographic skills. This could be the cause of gender differences in writing skills [22]. The incidence of dysgraphia among school children in India was 14%, and of dyscalculia was 5.5% [23,24].

Mathematics learning disability is common among school children and is more frequently seen in boys. Many children with learning disability in mathematics did not have comorbid reading disorder [25].

Risk Factors

Reading disability (dyslexia) arises from deficits in phonologic awareness [26,3]. Girls with low birth weight were more than twice at risk for developing reading disability. Girls whose mothers had 12 or fewer years of education were twice as likely to develop reading disability [19]. In the study

conducted among fifth-grade children with reading disability, in Japan, Taiwan, and United States, Stevenson HW et al found that combined effects of general information and verbal memory was the most effective predictors in Japan and Taiwan. The most important predictors for reading disability in American children were deficits in general information and coding [15].

There is increased prevalence of developmental comorbidities in children with epilepsy. There was high comorbidity of reading disability in children with rolandic epilepsy. The risk factors for reading disability in rolandic epilepsy included male sex, speech sound disorder and attention deficit hyperactivity disorder [27]. Siblings of patients with rolandic epilepsy are also at increased risk of reading disorder. Hence patients with rolandic epilepsy and their younger siblings need screening and intervention at early age to prevent reading disorder [28]. There is genetic basis for reading disability in rolandic epilepsy with loci at 1q42. The loci is at 7q21 in some populations [29].

Children with birth weight less than 2000 grams have poor visuo-motor perception and are at risk for developing reading disability and mathematics learning disability. The preterm children who are small for gestational age, as well as children with very low birth weight usually have poor cognitive abilities compared to children with normal birth weight [30].

Children with extremely low birthweight without gross physical impairments are at higher risk for developing learning disabilities. They are also prone to have cognitive deficiencies. Hence these children at risk should be identified early and learning problems should be managed scientifically [31].

Children with very low birth weight (<1500 grams) have higher risk for mathematics learning disabilities than children with normal birth weight. Children with very preterm birth (<32 weeks gestational age) are at greater risk for developing mathematics disorder compared to term-born children (>36 weeks gestational age). Along with mathematics disorder, other learning problems are also seen in these children. Children with neonatal complications are also at risk for developing mathematics disorder [32]. Results of a prospective longitudinal study involving 922 neonatal at risk children conducted in South Germany showed that with lower gestational age, the risk for mathematic impairment increases [33].

History of language delay, confusing words that sound alike and family history of reading disability are important red flags for dyslexia [14]. Deficiencies in encoding processes, especially working memory, are found in children with learning disability [34].

Recognition of risk factors will help teachers, parents and professionals in health care to direct these children for early intervention. This will reduce additional cognitive challenges for these children [5].

Importance of Early Intervention

Recent advances in child development have revealed that a child's early experience significantly affects the learning trajectory of that child. The limitations in social and cognitive development of the children entering kindergarten schools can be significantly reduced or eliminated through early identification and developmental interventions starting from infancy. The physical, social-emotional, and educational health of all children should be promoted from birth [35].

Prevention is always better than cure. An expert in child guidance can identify the deficits in phonological awareness in late kindergarten and early interventions can be provided to prevent reading disorder.

Most of the children with learning disabilities have deficits in basic reading skills. Severe reading disorder is a major problem for students especially if associated with attention deficit hyperactivity disorder. Even mild deficits in reading skills can cause problems in learning. Hence mild defects in reading should also be identified early and appropriate remedial intervention should be provided [2].

In a study involving 2,464 Norwegian adolescents of 12-15 years of age, reading difficulties were found in 7.8% of adolescents. These adolescents had higher levels of depression. They had more school stress and they worried more about going to school. Adolescents with reading difficulties also had lower score on Global Self-worth and on Social Acceptance scales [36]. Hence they need early remedial training and scientific guidance.

Students with learning disabilities have chronic academic underachievement and significant stress. Learning-disabled students have more anxiety compared to their peers [37]. Individuals with reading disability have more social, emotional and behavioural problems than those without reading problems [38]. Learning disabled children have adverse emotional outcomes due to academic stress which should be prevented [6]. Learning disorders cause significant negative impact on the emotional, behavioural and educational functioning of adolescents. Counselling given to adolescents will help them to deal with the stresses associated with learning disabilities [39].

Scientific guidance and remedial education with parent involvement should be provided for children with learning disabilities to improve their scholastic performance [40]. Multifactorial evaluations should be done and individualized education plan must be formulated for these children with the help of experts in the field of learning disability [41]. Improved academic outcome will increase the self-esteem of children. Hence, early identification and intervention of learning disability is essential [12,42,43].

It is very important to identify learning disability early and start intervention soon, because the longer these children go without identification, remediation will be more difficult and the rate of success will be lower [6,14]. All at risk children must be screened for developmental and learning problems. The students with learning problems should be given appropriate educational interventions. All parents and children who have concerns about school performance need evaluation by experts and scientific interventions must be started as early as possible [44].

Conclusion

Learning disability is common among children and it is an important cause of stress. Delay in expressive language development can lead to learning disability in the future and hence early intervention by experts in child guidance is necessary.

If not remedied at the earliest, learning disabilities will lead to failure in exams and can cause emotional and behavioural problems in children. These children also develop stress related disorders. Hence all children with learning problems should be evaluated scientifically for early identification of learning disability.

Scientific guidance to improve the coping skills, should be given to children and adolescents with learning disabilities to deal with the academic stress. Early intensive individualised remedial education should also be provided on one to one basis to manage the learning disability.

Students of today are the budding futures of all nations. In human resource development, education has a very important role. Hence there is urgent need to increase awareness regarding learning disabilities of children, among parents and teachers. The learning disabilities of children should be identified at the earliest and managed scientifically so that we can lead the children towards a very successful future life.

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