Poor School Performance

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Abstract. Education is one of the most important aspects of human resource development. Poor school performance not only results in the child having a low self-esteem, but also causes significant stress to the parents. There are many reasons for children to under perform at school, such as, medical problems, below average intelligence, specific learning disability, attention deficit hyperactivity disorder, emotional problems, poor socio-cultural home environment, psychiatric disorders and even environmental causes. The information provided by the parents, classroom teacher and school counselor about the child's academic difficulties guides the pediatrician to form an initial diagnosis. However, a multidisciplinary evaluation by an ophthalmologist, otolaryngologist, counselor, clinical psychologist, special educator, and child psychiatrist is usually necessary before making the final diagnosis. It is important to find the reason(s) for a child's poor school performance and come up with a treatment plan early so that the child can perform up to full potential. **[Indian J Pediatr 2005; 72 (11) : 961-967]**
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Education is one of the most important aspects of human resource development. Every child should have the opportunity to achieve his or her academic potential. It is generally noticed that at least 20% of children in a classroom get poor marks - they are "scholastically backward". Poor school performance should be seen as a "symptom" reflecting a larger underlying problem in children. This symptom not only results in the child having a low self-esteem, but also can cause significant stress to the parents. It is essential that this symptom be scientifically analyzed to discover its underlying cause(s) and find a remedy. This article reviews the causes for children to have poor school performance and describes its management.

Causes of Poor School Performance

There are many reasons for children to underperform at school, such as, medical problems, below average intelligence, specific learning disability, attention deficit hyperactivity disorder, emotional problems, a poor socio-cultural home environment, psychiatric disorders, or even environmental causes.

(1) Medical Problems

These conditions have been reported to have an independent effect resulting in poor school performance.

(a) ***Preterm birth and low birth weight (LBW):*** Up to 33% of children born between 32 and 35 weeks gestation and up to 25% of LBW babies (< 2000 g) are at risk for school difficulties into late childhood, even when not neurologically impaired.[1,2] Arithmetic, vocabulary, concentration, non-verbal intelligence, and attention problems are significant mediators of the effect of LBW on the school performance score.[2,3] Children born preterm, small for gestational age or with very low birth weight (< 1500 g), tend to have the poorest cognitive abilities.[3,4]

(b) ***Malnutrition and nutritional deficiencies:*** Malnutrition in early childhood is associated with poor cognition in later years and this is independent of psychosocial adversity.[5] Chronic iron deficiency anemia, zinc deficiency and inadequate intake of vitamins A, B_1, B_2, B_6, D_3, and E and niacinamide adversely affect long-term cognitive development.[6-8]

(c) ***Worm infestations:*** Infestation with roundworm, hookworm and whipworm often affects malnourished children's school performance because it can stunt growth, decrease physical activity, and cause poor mental development.[9, 10, 11]

(d) ***Hearing impairment:*** Children with otitis media with effusion and associated conductive loss during the first 4 years of life have been reported to score lower in math and expressive language between kindergarten and second grade.[12] Mild sensorineural hearing loss affects about 5 % of the school-aged population and these children experience difficulty on a series of educational and functional test measures.[13] Low birth weight and pyogenic meningitis are known risk factors for sensorineural deafness.[14-16]

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(e) ***Visual impairment:*** Amblyopia is present in 1.6-3.6% of preschool children and if left uncorrected may harm school performance.[17, 18] Reduced vision because of uncorrected refractive error is a major public health problem in children in India.[19] Murthy *et al* have reported an age-related shift in refractive error from hyperopia in young children (15.6% in 5-year-olds) toward myopia in older children (10.8% in 15-year-olds). Overall, hyperopia is present in 7.7% of children and myopia in 7.4%.[18]
The risk of refractive errors is higher in preterm infants than in infants born at term.[20, 21]
(f) ***Asthma and allergic rhinitis:*** Children with poorly controlled asthma have increased school absenteeism.[22] Children with moderate to severe "chronic asthma" may perform poorly due to the stress associated with a chronic illness.[23] Even short-term administration of theophylline to asymptomatic asthmatic children can adversely affect school performance.[24] Both uncontrolled symptoms of allergic rhinitis, as well as adverse effects from antihistamines, can diminish cognitive function and learning.[25]
(g) ***Epilepsy:*** Children with new onset idiopathic epilepsy are inordinately vulnerable when processing memory tasks.[26] Maladaptive reactions of parents and children to the onset of epilepsy and not reaching 6-months of seizure remission also contribute to poor school performance.[26] In a subset of epileptic children, anti-epileptic drugs (AEDs) can themselves affect cognition adversely. Although all AEDs have the potential for adverse effects on cognition, phenobarbitone and topiramate have the highest potential for causing cognitive dysfunction.[27]
(h) ***Cerebral Palsy:*** Children with cerebral palsy have functional activity limitations which can significantly impair their learning.[28] Additional co-morbidity (visual disability, epilepsy) further complicates their problem.[28]
(i) ***Leukemia and lymphoma:*** Cranial irradiation is the major cause of learning problems in children treated for leukemia and lymphoma, especially those who have been irradiated when under 6 years of age.[29, 30]
(j) ***Sickle cell anemia:*** Children with silent cerebral infarcts show high rates of poor educational attainment.[31]
(k) ***Thallasemia major:*** Poor school performance can occur due to frequent absenteeism due to the need to receive monthly packed cell transfusions.[32]
(l) ***Hemophilia:*** Increased school absenteeism and hemophilia-related limitations in physical functioning among children with greater frequency of bleeding episodes result in lower academic scores.[33]
(m) ***Type I Diabetes mellitus:*** Children with hospitalizations for hyperglycemia are at risk for academic underachievement due to increased school absenteeism. Also, children with hypoglycemic hospitalizations need careful monitoring to ensure that episodes of hypoglycemia associated with seizures are not adversely affecting learning.[34]
(n) ***Congenital hypothyroidism (CH):*** School attainments of early treated CH children are within the normal range in most affected cases.[35, 36] Low IQ scores and poor language performances at the age of 5 yrs are associated with subsequent school learning disorders.[35] Recurrent episodes of insufficiently suppressed TSH levels (> or = 15 mUi/L at least four times during follow-up from the age of 6 months onwards) are associated with school delay.[36]
(o) ***Habitual snoring:*** Sleep-disordered breathing with habitual snoring is associated with hyperactive, inattentive behavior and poor academic performance in primary school children.[37, 38] This underachievement may continue even after the habitual snoring ceases post tonsillo-adenoidectomy.[38]

(2) Below Average Intelligence

It is well known that intelligence (measured as the intelligence quotient or IQ) is one of the important prognostic variables in the academic outcome of children. Children with borderline intelligence or "slow learners" (IQ 71 to 84), or mental retardation (IQ≤70), irrespective of the etiology (past history of prematurity, neonatal TORCH infections, meningitis, encephalitis, head injury; Down syndrome, Fragile X syndrome, Turner syndrome, Klinefelter syndrome, etc.) present with poor school performance or school failure.[39, 40] Children born and brought up in iodine-deficient environment have significant impairment in language, memory, conceptual thinking, numerical reasoning and motor skills.[41] Children with below average intelligence usually have history of developmental delay.[39]

(3) Neurobehavioral Disorders

(a) ***Specific learning disability (SpLD):*** SpLD *viz.* dyslexia, dysgraphia and dyscalculia is a generic term that refers to a heterogeneous group of disorders manifested by significant unexpected, specific and persistent difficulties in the acquisition and use of reading (dyslexia), writing (dysgraphia) or mathematical (dyscalculia) abilities despite conventional instruction, normal intelligence, proper motivation and adequate socio-cultural opportunity.[42, 43] SpLD is presumed to be due to central nervous system dysfunction.[44] A history of language delay, or of not attending to the sounds of words (trouble playing rhyming games with words, or confusing words that sound alike), along with a family history, are important red flags for dyslexia.[43] Substantial evidence has established that the children with dyslexia have deficits in phonologic awareness.[44] The functional unit of the phonologic module is the "phoneme", defined as the smallest discernible segment of speech; for example, the word "bat" consists of three phonemes: /b/ /ae/ /t/ (buh, aah, tuh). Children with dyslexia have difficulty developing an awareness that words, both written and spoken, can be broken down into smaller units of sound and that, in fact, the letters constituting the

printed word represent the sounds heard in the spoken word.[44] Dyslexia is genetically inherited and boys generally outnumber girls in the ratio of three to one.[43]

Children with SpLD fail to achieve school grades at a level that is commensurate with their intelligence. Repeated spelling mistakes, untidy or illegible handwriting with poor sequencing, inability to perform simple mathematical calculations correctly are the hallmarks of this life-long condition.[42, 43]

Dyslexia affects 80% of all those identified as learning-disabled and its incidence in school children in USA ranges between 5.3- 11.8%.[43, 45] Information on SpLD in Indian children is scanty. The incidence of dyslexia in primary school children in India has been reported to be 2-18%, of dysgraphia 14%, and of dyscalculia 5.5%.[46-48]

(b) *Attention deficit hyperactivity disorder (ADHD):* ADHD affects 8-12% of children worldwide and results in inattention, impulsivity and hyperactivity.[49] Children with ADHD are at risk for poor school performance.[49] Up to 20-25% of children with ADHD have SpLD and *vice versa*.[43, 49]

(c) *Autism:* Even non-retarded autistic children face a lot of problems in school as their core features (impairment of reciprocal social interactions, impaired communication skills and restricted range of interests or repetitive behaviors) impair learning.[50, 51] These core features do not change qualitatively. Also, they often demonstrate distress and opposition when exposed to requests to complete academic tasks.[50, 51]

(d) *Tourette syndrome (TS):* Children with TS are at a higher risk for academic failure.[52] In the majority of TS patients, the disorder starts with ADHD and 2.4 years later, develops motor and vocal tics. Specific cognitive deficits, presence of co-morbid conditions, notably ADHD and oppositional conduct disorder significantly increase the likelihood that an individual with TS will also have learning problems.[52]

(4) Emotional Problems

Conditions which cause emotional problems in children *viz.* chronic neglect, sexual abuse, parents getting divorced or losing a sibling might cause long term distress resulting in academic underachievement.[53-56] Children can face severe emotional upheavals during the treatment of chronic health impairments such as asthma, cancer, cerebral palsy, congenital heart disease, diabetes mellitus, epilepsy, hemophilia, rheumatic diseases, or thallasemia, resulting in low self-esteem and loss of motivation to study.[23, 26, 32-34, 57-59] Despite average intelligence, absence of significant family dysfunction and advantaged social background, a large number of children with isolated growth-hormone deficiency or with idiopathic short stature develop low self-image, behavioral problems and have academic underachievement.[60] In recent times, HIV-infected children have also been reported to exhibit clinically significant emotional problems.[61]

(5) Poor Sociocultural Home Environment

It has been recognized that children from poor socio-economic status families have higher chances of poor school performance.[62-66] Malnutrition due to poverty coupled with low education and status of parents adversely affect their cognitive development.[64, 65] Such children also have higher chances of experiencing, right from their pre-school years, parental attitudes which do not motivate them to study and an unsatisfactory home environment which does not encourage learning (witnessing domestic violence, family stressors, adverse life events).[66, 67]

Another feature we regularly observe in our clinic is that many of these disadvantaged children are studying in English medium schools as their parents believe that this would help them progress in life. These children face the added burden of "language barrier", namely, they are not conversant in English as they came from non-English speaking families, which leads to poor school performance or even school failure.

(6) Psychiatric Disorders

Poor academic functioning and inconsistent school attendance are the early signs of emerging or existing depression or psychosis.[68] Clinicians need to inquire not only about the classic symptoms of depression such as anhedonia but also about less obvious symptoms such as unprovoked irritability, unsubstantiated complaints of lack of love from family members, somatic complaints, and problems with concentration in school.[68] Conduct disorder and oppositional defiant disorder are other known psychiatric causes of poor school performance. It is well known that Wilson disease and subacute sclerosing pan encephalitis (SSPE) can present as change in the child's personality and deteriorating school performance.

(7) Environmental Causes

Children living in noisy environment can exhibit poor academic performance.[69] Too much television-viewing among children has been linked with inadequate study patterns.[70, 71] Inappropriate television-viewing among adolescents has been linked to erratic sleep/wake schedules and poor sleep quality, violent or aggressive behavior, substance use, sexual activity resulting in decreased school performance or even school drop-out.[70, 71] There is irrefutable evidence that environmental-lead exposure can lead to mild intellectual impairment, hyperactivity, shortened concentration span, hearing impairment, violent/aggressive behavior all resulting in poor school performance.[72]

Management of Poor School Performance

(1) Approach to the Diagnosis: It is important to remember that a child may be having more than one reason for the poor school performance. Hence the

pediatrician should take a detailed medical and developmental history and do a thorough physical and neurological examination to identify any medical, neurobehavioral, emotional, socio-cultural, psychiatric or environmental causes for the poor school performance. Also, the pediatrician should gather information from the parents, classroom teacher and school counselor which clearly describe the child's behavior, social functioning and the academic difficulties. This information is crucial for the pediatrician to form an initial diagnosis.

Next, the pediatrician should refer the child to other specialists before a final diagnosis can be made. For this, an evaluation by an ophthalmologist, otolaryngologist, counselor and clinical psychologist is necessary for each child. Vision and audiometric testing should be done and correctible visual and hearing problems should be attended to. The Counselor should take a thorough social history to find out details of the home and school environments and to rule out that problem due to stress at home or school is not *primarily* responsible for the child's academic underachievement. In case the problems are severe, for example, severe anxiety or depression, it is necessary that the child be assessed and treated (psychotherapy, medications) by a child psychiatrist before the child's IQ is determined. The clinical psychologist should perform a standard test, for example, Wechsler Intelligence Scale for Children (WISC) test or the Stanford Binet Intelligence Scale for determining the child's level of intelligence (IQ) to identify borderline intellectual functioning and mental retardation.[42, 43] However any such test should be adapted to the country's population before being used, for example WISC test [Indian adaptation by MC Bhatt].[73]

Depending on the history, additional evaluation by a child psychiatrist and/or a special educator may also be necessary. It is advisable to consult a child psychiatrist before a final diagnosis of ADHD, autism or Tourette syndrome is made. The special educator assesses the child's academic achievement by administering a standard educational test (*e.g.* Wide Range Achievement Test, Peabody Individual Achievement Test, Woodcock-Johnson Tests of Achievement, Schonnel Attainment Test, or Curriculum Based Test) which assesses the child's performance in areas such as reading, spelling, written language, and mathematics. An academic achievement of two years below the child's actual school grade placement or chronological age is considered diagnostic of SpLD.[42, 43]

(2) Treatment: This should begin as soon as the reason(s) is identified. If any specific medical reason has been identified, the pediatrician should treat it as effectively as possible. For example, correction of hearing and/or visual impairment, optimum control of asthma, prescribing a non-sedating second-generation antihistamine for allergic rhinitis, rational therapy of epilepsy to achieve seizure control by using the correct AED effectively, and achieving long-term euglycemic control in juvenile diabetics. It is the responsibility of the pediatrician to ensure that the parents are sufficiently educated about any chronic medical condition, especially congenital hypothyroidism or Wilson disease, so that non-compliance with the treatment does not again lead to poor school performance.

In general, children, irrespective of their physical, sensory, or neurobehavioral deficits, must be educated in regular mainstream schools ("inclusive education"). Referral to special schools should be made only in exceptional circumstances for children with severe and profound impairments. If a child with borderline intelligence finds it extremely difficult to cope with the curriculum and speed of teaching in regular mainstream schools, a change to the curriculum of the National Institute of Open Schooling (NIOS), an autonomous organization by the Ministry of Human Resource Development, Government of India (http://www.nos.org/) may be needed.[74] Children with mental retardation may also need to avail appropriate special education. For reasons stated earlier, non-retarded autistic children may require to attend special schools.

The cornerstone of treatment of SpLD is remedial education, which should ideally begin early when the child is in primary school.[42, 43] Using specific teaching strategies and teaching materials, the special educator formulates an individual education program to reduce, eliminate or preclude the child's deficiencies in specific learning areas such as reading, writing and mathematics identified during the child's educational assessment. The child has to undergo remedial education sessions twice or thrice weekly for a few years to achieve academic competence.[75] During these sessions the child undergoes systematic and highly structured training exercises to learn that words can be segmented into smaller units of sound (phoneme awareness), and that these sounds are linked with specific letters and letter patterns (phonics).[43, 75] The child also requires practice in reading stories, both to apply newly acquired decoding skills to reading words in context and to experience reading for meaning.[43] The management of SpLD in the more time-demanding setting of secondary school is based more on providing provisions (accommodations) rather than remediation.[42,43] These provisions, *e.g.* exemption from spelling mistakes, availing extra time for written tests, dropping a second language and substituting it with work experience, dropping algebra and geometry and substituting them with lower grade of mathematics and work experience, are meant to help the child cope up in a regular mainstream school.[42, 43] With appropriate remedial education and provisions, most children with SpLD can be expected to achieve academic competence and complete their education in a regular mainstream school.[42, 43] However, some children with SpLD who continue to experience academic failure in spite of remediation and provisions may need to change to the NIOS curriculum.[74]

Children with ADHD need psychiatric consultation for

counseling, behavior modification, and/or medications, such as methylphenidate or atomoxetine.[49] Medications have been shown to be effective in significantly reducing the symptoms of inattention, impulsivity and hyperactivity resulting in improved school performance.[49] Children with ADHD should continue their education in regular mainstream schools.[49] Children with TS need psychiatric medications for their verbal/motor tics and co-morbidities. Some children with TS have SpLD which needs remedial education and provisions.[50]

Children with emotional problems need counseling sessions with a child psychologist or a child psychiatrist. Depending on the severity, at times, appropriate medications (anxiolytics, antidepressants) may be needed.

Alleviation of hunger, by providing one balanced meal in school, is one of the mechanisms to improve academic achievement in undernourished low-income elementary school children.[76] Treatment of iron deficiency anemia and multivitamin deficiencies, zinc supplementation and deworming is also beneficial in malnourished children.[6-8,11] Parents of children with "language barrier" should be counseled to educate their children in their own language medium schools or to attend a facility for "language stimulation" if that is available and affordable.[77]

Prevention of Poor School Performance

Teachers should be trained to suspect emotional problems, SpLD, and ADHD so that they are diagnosed and treated early. Programs aimed at alleviation of poverty and adult illiteracy, providing good ante-natal and peri-natal services, well-baby clinics (exclusive breastfeeding up to 4-6 months, proper weaning, immunization), universal use of iodized salt, school feeding programs (midday meal), periodic deworming, vitamin A supplementation programs, regular vision and hearing screening camps in schools can help prevent poor school performance.

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