# Clinical and Psychoeducational Profile of Children with Borderline Intellectual Functioning

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#### **ABSTRACT**

**Objective.** To document the clinical profile and academic history of children with borderline intellectual functioning ("slow learners"); and to assess parental knowledge and attitudes regarding this condition.

**Methods.** From November 2004 to April 2005, 55 children (35 boys, 20 girls) were diagnosed as slow learners based on current level of academic functioning and global IQ scores (71-84) done by the WISC test. Detailed clinical and academic history; and physical and neurological examination findings were noted. The parents were counseled about the diagnosis and the option of special education.

**Results.** The mean age of slow learners was 11.9 years (±SD 2.3, range 8-17). Eighteen (32.7%) children had a significant perinatal history, 15 (27.3%) had delayed walking, 17 (30.9%) had delayed talking, 17 (30.9%) had microcephaly, 34 (61.8%) had presence of soft neurologic signs, and 10 (18.2%) were on complementary and alternative medication therapy. There were no differentiating features between the two gender groups. Their chief academic problems were difficulty in writing (92.7%), overall poor performance in all subjects (89.1%), and difficulty in mathematics (76.4%). Forty-six (83.6%) children had failed in examinations, 34 (61.8%) had experienced grade retention, and 32 (58.2%) had behavior problems. Most parents (83.3%) were reluctant to consider the option of special education.

**Conclusion.** Slow learners struggle to cope up with the academic demands of the regular classroom. They need to be identified at an early age and their parents counseled to understand their academic abilities. [Indian J Pediatr 2008; 75 (8): 795-800] *E-mail: karandesunil@yahoo.com* 

Key words: Academic performance; Borderline intelligence; Grade retention; Scholastic backwardness; Slow learners

Children with borderline intellectual functioning ("slow learners") have an intelligence quotient (IQ) in the range of 71 to 84. Impaired adaptive functioning which manifests as difficulties in academic, social, or vocational areas accompanies this condition. A child's intellectual level and current and past levels of academic functioning should be assessed to diagnose borderline intellectual functioning. Although slow learners comprise up to 7% of the school-going population, few studies have been conducted to identify their problems.

It is well known that intelligence (measured as IQ) is one of the important prognostic variables in the academic outcome of children.<sup>5</sup> Slow learners lag behind in the regular classroom as the speed and methods of teaching is

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inappropriate for their learning ability. Slow learners are unable to achieve the academic standards as expected for average students (IQ 85-109) for passing their examinations.

It is known that many slow learners attending regular mainstream schools are able to achieve adequate academic competence provided they also receive "additional individualized education". 5,6 Unfortunately, in our country, most regular mainstream schools do not have resource rooms to provide additional individualized education to slow learners.<sup>5,6</sup> In a classroom of 40 or 50 students, the teacher is unable to provide individual attention to those who lag behind in studies.<sup>5,6</sup> Consequently, slow learners most often do not get sufficient attention in regular mainstream schools, fail repeatedly in examinations, and become school dropouts.4,5,7 Slow learners have been reported to experience severe emotional distress, lose their selfesteem, and by adolescence are at risk to develop mood and conduct disorders.8

Slow learners who cannot cope up in regular mainstream schools have the option of continuing their education in schools offering the National Institute of Open Schooling (NIOS) curriculum which caters to their educational needs from elementary education to courses at the pre-degree level.9 Unlike the regular mainstream education system, the NIOS special education system is flexible which helps reduce the stress on students.9 Students enrolled in the NIOS not only can choose five to seven subjects as per their requirements and goals, but can also learn at their own pace and convenience.9 The students even have the freedom to appear for the examinations in their chosen subjects one by one as per their preparation.9 The NIOS also offers several "vocational education courses" such as carpentry, bakery and confectionery, typewriting, etc. for those students who are unable to do the academic NIOS courses; or who wish to do them in addition to the academic NIOS courses.9

We conducted the present study to document and analyze the clinical profile and academic history of slow learners diagnosed in our Learning Disability (LD) clinic; and to assess parental knowledge and attitudes regarding this condition.

## **MATERIALS AND METHODS**

#### **Selection of Cases**

Children studying in English medium schools who were referred to our clinic for complaints of poor school performance and diagnosed as having borderline intellectual functioning over a period of six months (from November 2004 to April 2005) were included in the present study. The present study sample was by necessity a convenience sample. All parents were aware that their child had been referred for assessment of poor school performance.

## Consent and ethical approval

The present study was approved by the scientific and ethics committees of our institution. All parents had signed an informed consent form to participate in the study.

## Diagnosis of borderline intellectual functioning

Each child was assessed by a multidisciplinary team comprising of pediatrician (SuK or SaK), clinical psychologist, and counselor before the diagnosis of borderline intellectual functioning was confirmed.<sup>5</sup> Audiometric and ophthalmic examinations were conducted to rule out non-correctable hearing and/or visual deficits (disability level of >40%) as we do not have tests to determine the level of intellectual functioning in children with such deficits. The pediatrician took a

detailed clinical history; and did a detailed physical and neurological examination. The socio-demographic characteristics of each child were noted. The modified Kuppuswami's classification was used to determine the child's socioeconomic status. <sup>10,11</sup> Each child's academic and behavior problems as described by the school principal/ classroom teacher in the referral letter; and a copy of the last few annual and / or periodical examination mark sheets was documented.

The parents (either mother or father) were interviewed to get specific information about their child's academic history, namely, at what age the learning problem was first noticed and by whom, number of times the child had been retained in a class standard ("grade retention"), and number of times and reasons for the school being changed. The clinical psychologist conducted the standard test viz. Wechsler Intelligence Scale for Children-Revised (WISC) [Indian adaptation by MC Bhatt] to determine the child's level of intellectual functioning.<sup>12</sup> The counselor interviewed the parent(s) to get specific information about any behavior problems that had developed in the child. Children in whom associated behavior problems or attention deficit hyperactivity disorder (ADHD) was suspected were evaluated by a child psychiatrist to confirm these co-morbidities as per standard DSM-IV criteria.1

At the time of certification, the parents were asked whether they were aware of the term "slow learner" and the "NIOS" special education facilities. Next, they were counseled about their child's diagnosis, namely, that their child has borderline intelligence which is the primary reason for the poor school performance. Lastly, they were counseled that the NIOS offers an opportunity for their child to receive an "academic and vocational education" appropriately tailored to their child's abilities and interests. The parents were contacted after a month by telephone to find out whether they were willing to consider the option of special education; and the reasons for their decisions were noted ad *verbatim*.

## Data analysis

The data were analyzed using the Statistical Package for the Social Sciences program, version 11.0 for Windows (SPSS Ltd., Chicago, Illinois, USA). Results obtained were compared using the Chi-square test (using Yates' correction where necessary), or the unpaired student's ttest, as applicable. Wherever appropriate, with bivariate analysis, the odds ratio (OD) was calculated and 95% confidence interval (CI) was estimated around the OR. A two-tailed *P* value of <0.05 was considered significant.

# **RESULTS**

Of the 349 children referred, 70 (20.1%) were diagnosed as slow learners. Of the 70 enrolled children, 15 (21.4%)

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parents declined to participate. The male: female ratio in the 55 (35 boys, 20 girls) children who participated in the study was 1.7:1 (Table 1). A large majority of 41 (74.5%) slow learners were studying in the secondary school section at the time of diagnosis (Table 2). In spite of learning problems having been noticed in the children there was a delay (mean time period of 3.8 years) in referring the child for assessing these problems (Table 3).

Table 1. Age and Gender Distribution of Study Children at Diagnosis

Age group (years)	All	Boys	Girls
8 - < 9	3	2	1
9 - < 10	4	3	1
10 - < 11	10	6	4
11 - < 12	10	6	4
12 - < 13	10	8	2
13 - < 14	1	1	0
14 - < 15	7	4	3
15 - < 16	10	5	5
All	55	35	20

Table 2. School Standard Distribution of Study Children at Diagnosis

School standard	All	Boys	Girls
I	2	1	1
II	0	0	0
III	8	5	3
IV	4	3	1
V	14	9	5
VI	7	5	2
VII	4	4	0
VIII	5	2	3
IX	8	5	3
X	3	1	2
All	55	35	20

All children were well nourished and belonged to either the upper or middle socioeconomic strata of society (Table 3). Eighteen (32.7%) children (Table 4) had a significant perinatal history, namely, preterm delivery, birth asphyxia, low birth weight, or exchange transfusion for neonatal hyperbilirubinemia. Parents gave history of delayed walking or delayed talking in less than 1/3rd of the cases; and majority of 42 (76.4%) children did not have any past illness. Forty (72.7%) children had normal vision and the remaining 15 (27.3%) who had minor correctible refractive errors were using spectacles. Fifty-four (98.2%) children had normal hearing, and remaining one (1.8%) had mild sensorineural deafness. On physical examination (Table 4), 38 (69.1%) children had a normal head circumference. Microcephaly, defined as a head circumference that measures less than three standard deviations below the mean for age and sex, was detected in the remaining (30.9%) children. One or more minor atypical physical features ("dysmorphic") features were present in nine (16.4%) children. These dysmorphic features included hypertelorism, epicanthal folds, low-set

pinna, flattened nasal bridge, high-arched palate, increased length of philtrum, long and thin tapered fingers, and transverse palmar crease. However, no syndromic diagnosis could be made in any child. One to two small (2 x 2 cm) café-au-lait spots were present in 11 (20%) children; and one child (1.8%) had a white ash-leaf macule. Gross examination of central and peripheral nervous system, including, assessment of power, tone, and reflexes was normal in all children. However, 34 (61.8%) children had presence of one or more soft namely, neurologic signs, graphaesthesia, dysdiadokokinesis, tandem walking, hopping, and finger identification.

Forty-six (83.6%) children had failed in their periodical and / or annual school examinations; of these 34 (61.8%) had experienced grade retention. Twenty-six (47.3%) children had experienced grade retention once, seven (12.7%) twice, and one (1.8%) thrice. Since their child was unable to cope up, parents of 24 (43.6%) children had already changed the school: either of their own will, and / or because the earlier school authorities had asked the child to leave. Twenty (36.4%) children had changed school once, three (5.5%) twice, and one (1.8%) thrice. Medical history and clinical examination did not reveal any differentiating features between the two gender groups (Tables 3,4).

Table 5 displays the academic and behavior problems of under study children in the classroom as mentioned by the school authorities in their referral letter. After parental (50 mothers, five fathers) interview and psychiatric evaluation, behavior problems were diagnosed in 32 (58.2%) children and ADHD (combined type) was diagnosed in two (3.6%) children. Behavior problems such as aggression was noted in 22 (40%) children, anxiety in 10 (18.2%), and withdrawal in seven (12.7%). Depression was diagnosed in three (5.5%) children. Parents of 10 (18.2%) children had already started complementary and alternative medication (CAM) therapy in the form of homeopathic or ayurvedic medicines to improve their child's poor school performance and/ or behavior.

Although all the parents were literate, at certification, only six (10.9%) were aware of the term "slow learner" correctly, namely, that it indicates "a person with borderline intelligence". Only seven (12.7%) parents were aware of the NIOS special education facilities. A month after counseling, 42 out of 55 parents could be contacted. Of these 42 parents, only seven (16.7%) were willing to consider the option of special education. Table 6 lists the parental reasons for not opting for special education.

# **DISCUSSION**

The present study documents that most slow learners have normal perinatal history, milestones, physical appearance, and physical health. Also, the present study

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TABLE 3. Demographic Data and IQ Scores of Study Children According to Gender

	$ A11 \\ (n = 55) $	Boys $(n = 35)$	Girls $(n=20)$	P value
Age at diagnosis m $\pm$ SD (yrs) ( $r$ )	11.91 ± 2.29 (8- 17)	11.74 ± 2.20 (8-17)	12.20 ± 2.46 (8-16)	0.478*
Age problem noticed $m \pm SD$ (yrs) ( $r$ )	$8.11 \pm 2.02$ $(4-13)$	$7.94 \pm 2.04$ $(4-12)$	8.40 ± 1.98 (5-13)	0.421*
IQ scores	, ,	, ,	, ,	
$m \pm SD(r)$				
Verbal	$75.60 \pm 7.90$	$74.60 \pm 7.02$	$77.35 \pm 9.17$	0.217*
	(63-101)	(64-89)	(63-101)	
Performance	$88.44 \pm 9.66$	$88.71 \pm 10.18$	$87.95 \pm 8.89$	0.782*
	(67- 107)	(67-107)	(71-102)	
Global	$80.16 \pm 3.58$	$80.00 \pm 3.97$	$80.70 \pm 3.20$	0.504*
	(71-84)	(71-84)	(73-84)	
Socioeconomic status	` '	,	, ,	1.000**
Upper	11 (20.0)#	7 (20.0)	4 (20.0)	
Upper middle	33 (60.0)	21 (60.0)	12 (60.0)	
Lower middle	11 (20.0)	7 (20.0)	4 (20.0)	
Problem first noticed by	` ,	0.160**	` ,	
Mother	25 (45.5)	13 (37.1)#	12 (60.0)	
Teacher	23 (41.8)	18 (51.4)	5 (25.0)	
Father	6 (10.9)	3 (8.6)	3 (15.0)	
Uncle	1 (1.8)	1 (2.9)	0 (0.0)	

<sup>&</sup>lt;sup>a</sup> P<0.05 significant; \*student's t-test, \*\*  $\chi^2$  test, m = mean

Table 4. Clinical History and Findings of Study Children According to Gender

	A11 (n = 55) (%)	Boys $(n = 35)$ (%)	Girls (n = 20) (%)	ORa	95% CI	P value <sup>b</sup>
Significant peri-natal history	18 (32.7)	13 (37.1)	5 (25.0)	1.8	0.5-6.0	0.532
Delayed walking	15 (27.3)	11 (31.4)	4 (20.0)	1.8	0.5-6.8	0.548
Delayed talking	17 (30.9)	12 (34.3)	5 (25.0)	1.6	0.5-5.4	0.679
Past illness						
None	42 (76.4)	26 (74.3)	16 (80.0)	1.4	0.4-5.2	0.881
Nocturnal enuresis	8 (14.5)	6 (17.1)	2 (10.0)	1.9	0.3-10.2	0.745
Epilepsy	2 (3.6)	1 (2.9)	1 (5.0)	0.6	0.03-9.5	0.683
Meningitis	1 (1.8)	1 (2.9)	0 (0.0)	_c	-	0.446
Febrile convulsions	1 (1.8)	1 (2.9)	0 (0.0)	-	-	0.446
Neurocysticercosis	1 (1.8)	0 (0.0)	1 (5.0)	-	-	0.775
Past head injury	2 (3.6)	1 (2.9)	1 (5.0)	0.6	0.03-9.5	0.683
Microcephaly	17 (30.9)	9 (25.7)	8 (40.0)	0.5	0.2-1.7	0.270
Dysmorphic features	9 (16.4)	8 (22.9)	1 (5.0)	5.6	0.7-48.8	0.179
Neurocutaneous markers	12 (21.9)	10 (28.6)	2 (10.0)	3.6	0.7-18.5	0.206
Left handed	8 (14.5)	5 (14.3)	3 (15.0)	0.9	0.2 - 4.5	0.942
Soft neurologic signs	34 (61.8)	21 (60.0)	13 (65.0)	0.8	0.3-2.5	0.714
Associated ADHD	2 (3.6)	1 (2.9)	1 (5.0)	0.6	0.03-9.5	0.683
Behavior problems	32 (58.2)	20 (57.1)	12 (60.0)	0.9	0.3-2.7	0.836
On CAM therapy	10 (18.2)	6 (17.1)	4 (20.0)	0.8	0.2-3.4	0.792
School failure	46 (83.6)	30 (85.7)	16 (80.0)	1.5	0.4-6.4	0.863
School grade retention	34 (61.8)	22 (62.9)	12 (60.0)	1.1	0.4-3.5	0.834
School changed	24 (43.6)	14 (40.0)	10 (50.0)	0.7	0.2-2.0	0.472

OR, odds ratio; CI, confidence interval;  ${}^{a}$ OR calculated by bivariate analysis;  ${}^{b}\chi^{2}$  test, P<0.05 significant.

documents that there is a delay in diagnosis which results in most of these children experiencing failure in school examinations, grade retention, school being changed, and development of behavior problems. Most parents are unaware of the term "slow learner" and are reluctant to consider the option of special education for their child.

It is well known that genetic factors play a primary role in intellectual deficits.<sup>5</sup> In addition, it is known that other factors such as prematurity, low birth weight, birth asphyxia, chronic malnutrition, low socioeconomic status, play a contributory role in adversely affecting the

r = range; \*Percentages given in parentheses.

 $<sup>^{\</sup>rm c}$  OR cannot be computed. They are only computed for a 2  $\times$  2 tables without empty cells.

ADHD = attention deficit hyperactivity disorder; CAM = complementary and alternative medication.

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intellectual ability in children. 13-15 In the present study, none of the children were undernourished or from the lower socioeconomic strata of society. Majority of cases (67.3%) did not have contributory factors such as prematurity, low birth weight, or birth asphyxia to explain their borderline intellectual functioning. Microcephaly was detected in 30.9% cases and dysmorphic features were detected in 16.4% cases. These are known physical features in slow learners. 16,17 In the present study the physical appearance in majority of cases (69.1%) was normal. This finding has clinical significance and has been reported earlier.4 A teacher or parent will not be able to differentiate the slow learner from the average student by physical appearance and would have the same expectations from them as from the latter.4 In the present study 61.8% children had presence of one or more soft neurologic signs. Although soft neurologic signs are known to be associated with children having behavior, coordination, and learning difficulties they are not diagnostic of any particular condition and give pediatricians little information to guide for further management.18

ADHD-combined type, a known co-morbidity in slow learners, was diagnosed in only 2 (3.6%) cases, although 16-18% had displayed hyperactivity / inattentiveness in the classroom. These two children were started on methylphenidate therapy. Majority of children (58.2%)

Table 5. Academic and Behavior Problems of Study Children in Classroom

	All (n = 55) (%)	Boys (n = 35) (%)	Girls (n = 20) (%)
Difficulty in writing	51 (92.7)	33 (94.3)	18 (90.0)
Overall poor in all subjects	49 (89.1)	34 (97.1)	15 (75.0)
Difficulty in mathematics	42 (76.4)	26 (74.3)	16 (80.0)
Poor memory	15 (27.3)	10 (28.6)	5 (25.0)
Difficulty in reading	14 (25.5)	11 (31.4)	3 (15.0)
Hyperactive in classroom	10 (18.2)	7 (20.0)	3 (15.0)
Inattentive in classroom	9 (16.4)	5 (14.3)	4 (20.0)

Most children had more than one problem.

TABLE 6. Parental Reasons for not Opting for Special Education

Reason stated			parents 35) (%)
1.	Will improve child's school performance by private tuitions	7: 29 16	(82.9)
	complementary or alternative medicines	7	
	increasing parental attention	12	
	yoga	3	
2.	Society will look down on our child	14	(40.0)
3.	Child not willing to change school	7	(20.0)
4.	NIOS school too far way from residence	4	(11.4)
5.	Child will become mentally retarded in special school	1	(2.9)

Many parents had more than one reason.

had already developed behavior problems by the time they had been referred for scholastic backwardness. These children along with their parents required counseling sessions; some children were also prescribed a short-course of anxiolytics. It is known that children who experience failure in school examinations / grade retention suffer from severe emotional stress and develop behavior problems such as aggression / anxiety / withdrawal. <sup>20,21</sup>

An overall poor performance in all school subjects, difficulty in reading / writing / mathematics, poor memory, and hyperactivity / inattentiveness in the classroom are the usual problems noticed by classroom teachers in slow learners.4 Similar problems have been documented in the present study. A standard psychological test like the WISC test, if done in every child performing poorly in school will help identify slow learners early and prevent the behavior problems that result due to late diagnosis. The present study has important information that has not been reported earlier. We have documented that many parents believe that just employing private tuitions and / or using CAM therapy will improve their child's academic performance. Also, they were worried that society would look down on their child if he/ she went to a special school.

It would be appropriate to know the utility of the present study. First, the results of the present study will help generate awareness about slow learners among pediatricians and school authorities all over our country and result in their early identification. Second, we hope that the present study will inspire school authorities to begin resource rooms for slow learners in regular mainstream schools, where they can receive additional individualized education to achieve adequate academic competence. Third, we hope that till the time such ideal educational facilities are made available, pediatricians will be able to counsel the parents of slow learners of the benefits of the NIOS system of education. Such timely counseling will prevent slow learners from experiencing grade retention and becoming school drop-outs. Also, opting for the NIOS system of education will help their children improve their self-esteem, and acquire realistic academic and vocational skills to become productive members of society in the future.

The present study has several limitations. First, considering the probable incidence of slow learners in our city the sample size is small. Also, one fifth of parents (21.4%) declined to participate in the study. Possibly they were disappointed that their child was not eligible for the provisions (such as extra time for written tests, *etc.*) available to children having specific learning disabilities (dyslexia, dysgraphia, dyscalculia), who by definition have average or above average intellectual functioning; or for some other unknown reasons. However, we still believe that these results are important as awareness

about slow learners is still limited and few children actually get diagnosed.<sup>5,6</sup> Second, the cross-sectional design of the present study, limited us from drawing conclusive cause-effect relationships between chronic poor school performance/grade retention and development of behavior problems. Third, some data (perinatal history, age of walking/talking, age when learning problems were first noticed) depends just on history, which may lead to memory bias. Fourth, slow learners from the lower socioeconomic strata of society were not present in our study population. Possibly, nonavailability of standardized psychological tests in vernacular languages led to this limitation. However, we do not believe that these limitations adversely affect the utility of our results.

#### CONCLUSION

The present study documents that most slow learners do not have any characteristic physical features. They are unable to achieve academic competence in the current pattern of regular mainstream education. They need to be identified at an early age so that they are taught with methods and at a speed which is appropriate for their learning ability. This would prevent slow learners experiencing failure in school examinations, grade retention and developing behavior problems. Since their parents are reluctant to consider the option of special education, they would need several counseling sessions to understand their child's condition and academic abilities.

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