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Research Article

Factors associated with academic backwardness in school children: a hospital based observational study

Poorva Gohiya*, Jyotsna Shrivastav

Department of Pediatrics, Gandhi Medical College, Bhopal, M.P., India

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***Correspondence:**
Dr. Poorva Gohiya,
E-mail: gohiyapoorva@gmail.com

ABSTRACT

Background: Academic backwardness is a problem with far reaching consequences. This study was undertaken with the aim of correlating IQ obtained through Weschlers intelligence scale for children with poor academic performance and also to ascertain various factors associated with academic backwardness.
Methods: All children in the age group 10 to 16 years brought with complaints of poor school performance were included in the study. They were evaluated with a thorough relevant history, physical examination audiometry, visual acuity and hematological parameters. IQ assessment was done using Wechsler Intelligence Score for Children (WISC) by clinical psychologist.
Results: 35.09% (n=20) children had subnormal IQs, the majority having normal IQ 63.91% (n=37). Behavioral disorders were the single largest group of associated factors followed by chronic medical illnesses, majority being epileptics on antiepileptic drugs. Among the various perinatal and postnatal factors, history of delayed development was significantly associated with subnormal IQ. There was no significant correlation of IQ test scores with marks scored in school examinations. r'= 0.195 was insignificant at 5% level. Majority of children performing poorly at school were not mentally subnormal. Behavioural disorders were present in children performing poorly at school.
Conclusions: Mental subnormality accounts for only a minority of children with academic backwardness. Behavioural disorders can either be the cause or effect of poor scholastic performance.

Keywords: Academic backwardness, School children, IQs, Wechsler intelligence score, Mental subnormality

INTRODUCTION

Academic performance and behaviour of children represent final common pathway, the convergence of many forces including interaction between cognitive strengths and deficits, environmental and cultural factors, temperament, educational experience and intrinsic resiliency. The cause of academic backwardness may be anywhere; right from the home to the grading system or even the examiner. Individual intelligence tests are the best available predictors of academic success.[1] However, the highest correlations that are achieved between IQ and achievement grade equivalents range from 0.5 to 0.6.[2] This study was undertaken to elucidate the relationship between them and to find the factors associated with poor school performance.

METHODS

The study was done in Department of Pediatrics Child Guidance and Adolescent Clinic, over a period of 1 year.

Inclusion criteria

1. All children between 10-16 years of age presenting with poor school performance. Poor school

performance being defined as consistently scoring below 50% or being failed in any subject repeatedly.[3]
2. Regular school going children.

Exclusion criteria

1. All children <10 years and >16 years old.
2. Children scoring below 50% only once.
3. Children studying through correspondence courses.

A directed paediatric evaluation was done including:

- A detailed history with respect to the complaints.
- Detailed perinatal, past medical history including history of recurrent otitis media, meningitis, encephalitis, epilepsy, major head trauma, CNS irradiation, any chronic medical illness.
- Developmental History.
- Family history of learning/neuro developmental disorders, speech and language disorders, genetic syndromes or heritable diseases.
- External stress/ socio emotional preoccupation: history of parental divorce, conflict or depression, family turmoil or violence, death/ illness of a family member.
- Child-school mismatch.
- Socio-economic class using Kuppuswamy scale.
- Combined and separate interviews for children and parents.
- Thorough physical examination for evidence of chronic medical conditions and genetic syndrome phenotype.

IQ was recorded using the Wechsler Intelligence scale for children by a trained clinical psychologist.

Visual acuity, audiometry, iron studies were done in all to exclude cognitive abnormalities due to iron deficiency anemia.

Statistical analysis was carried out with the help of the SPSS statistical package.

The data was collected in a pre-planned proforma and analyzed.

Correlation of academic performance with intelligence quotients was done using the Pearson's correlation coefficient.

$$r = \frac{\sum XY - \sum XY/n}{\frac{\sqrt{[X^2-(\sum X)^2]}}{n}\ \frac{[\sum Y^2-(\sum Y)^2]}{n}}$$

X = Independent variable i.e. IQ.

Y= Dependent variable i.e. marks obtained in previous school examination.

The significance of the correlation coefficient thus obtained was tested by dividing the observed r by the standard error. The analysis was carried out using SPSS statistical package.

RESULTS

The study group comprised of 57 children, 77.19% (n=44) male and 22.81% (n=13) female. 70.18% (n=40) were of age group between 10-13 years. And 29.80% (n=17) between 14-16 year. The majority i.e. 46/57 belonged to the Kuppuswamy socioeconomic class 2.

63.16% (n=36) had normal 1Q and 35.09% (n=20) were having subnormal IQ. Of the 20 children with subnormal IQ; 19 had an IQ between 50-69 (mild MR) and one had IQ between 35-49 (moderate MR). Of the 36 children with normal intelligence quotients, half of them had average IQ and the half had borderline IQ.

31 children were born at term and 26 were preterm at birth. Of the 31 full term children, 22 had normal IQ and 9 had mental sub normality, while among the 26 preterm children, 15 had normal IQ and 11 had mental sub normality.

22 out of the 57 children were born appropriate for date and 35 children were born low birth weight (<2500 g). Of the 22 children born appropriate for date; 17 had normal IQ and 5 had subnormal IQ. Of the 35 LBW children, 20 had normal IQ and 15 had mental subnormality.

There were 33 children with history of perinatal insults and 2 with history of postnatal insults. There were 14 children with associated medical disorders of which 8 had epilepsy and were on antiepileptic drugs, 3 had cerebral palsy (spastic diplegia).

A history of developmental delay was obtained in 5 out of the 18 children with normal intelligence; in 11 out of the 18 children with borderline intelligence and 15 out of the 19 children with mild mental retardation.

DISCUSSION

Of the total 57 children we studied, 44 (77.19%) were male and 13 (23.36%) female. This disproportionate representation can be a reflection of the sociocultural milieu of India, still denying opportunities for the girl child, or may be just incidental. To make any inference is unreasonable as it was a clinic based study and the attitude of the parents regarding the education of the girl child was not probed.

40 (70.18%) of the children were 10-13 years old and 17 (29.90%) 14-16 years old. This clustering in the early age group may be due to the relatively high prevalence of scholastic problems at the beginning of middle school as recorded by other studies also.[3]

36 (64.91%) had normal IQs; while only 20 (34.58%) had subnormal IQs. Literature shows a divided opinion on the causes of poor school performance and the predictors of academic success. No significant correlation of marks obtained in school examinations with IQ was found in our study, (r=0.195) while earlier studies recorded it in the range of 0.5 to 0.6.[1]

Associated factors were found in only 63% (n=36) of children with normal IQs; leaving almost one third i.e., 36.81% (n=21) with no identifiable cause. Subtle micronutrient deficiencies or other environmental problems which could not be made out in a few visits, may account for them. Many studies have proved the role of micronutrient deficiency exclusive of other factors.[4]

Behavioral disorders were found in 31.58% (n=18); medical problems in 21.07% (n=12); dyslexia in 3.5% (n=2); and family problems in 1.75% (n=1).

Among the children with subnormal intelligence, 27% (n=10) had no other associated factor; medical problems were found in 5% (n=2); behavioral disorders in 23% (n=25) and family problems in 5% (n=2).

The single largest group was behavioral disorders; a total of 31.58% (n=34) which are most likely to be due to a complex interaction of the personality and biological make-up of the child with both family relationships and the environment at school. This association has also been described by other researchers.[5-7] It is also difficult to say which comes first, poor academic progress may cause emotional upsets through frustration. Another study found that behavioral maladjustment in many domains is strongly associated with learning difficulties even after intelligence and socioeconomic factors are controlled.[7] It has also been seen in recent years that improving survival of low birth weight infants is accompanied by a higher prevalence of behavior disorders.[9] In our study the majority of children 61.11% (n=21) with behavioral disorders were born with low birth weight.

The majority of children with behavioral disorders in the present study were having normal intelligence 66.67% (n=18), but this association was not statistically significant when compared to the same in mentally retarded.

The next largest group was that of chronic illness which affect learning when students experience sensory, physical or other health related impairments or when the illness interferes with school. 29.82% (n=32) had associated medical problems, out of which, the majority having epilepsy (on antiepileptic drugs). 58.82% (n=19). Almost 19% (n=6) had spastic diplegia 9% had JRA and 12.5% had hypothyroidism. Epilepsy, its association with mental sub normality and its effect on school performance had always been an area of controversy.[10-12]

Only 47% (n=27) of the children with normal intelligence quotients had a history of developmental delay, while 84% (n=48) of the children with mental subnormality had history of developmental delay, this difference was found to be statistically significant ($p<0.01$). A strong and persistent connection between cognitive abilities and academic achievement has been documented by research.[13,14]

In the present study, the majority of children i.e. 80% (n=46) belonged to the Kuppuswamy class 2-the upper middle class. The fact that we were dealing with a group of the society who were concerned with the education of their children and it's a hospital based study. The effect of poor socioeconomic conditions on scholastic backwardness is studied in different studies though in our study we cannot draw any inference.

CONCLUSIONS

Factors other than mental retardation are associated with scholastic backwardness, in majority of children. There is no significant correlation between intelligence test scores and marks obtained in school examinations. No associated factor could be found in 22.81% of the children, subclinical micronutrient deficiencies, unshared family or personal stress factors etc. may be associated with them. The single largest group was of behavioral disorders, 31.58%, with majority having normal IQs; but this association was not statistically significant. Associated medical conditions are important in a large number of children performing poorly at school, 29.82% in the present study. Dyslexia was found only in a minority-1.75%; family problems were associated in 3.51%.

Though a number of perinatal and post natal factors were associated with children with subnormal intelligence, none was statistically significant, except for history of developmental delay.

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