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A STUDY OF PREVALENCE AND PATTERN OF HYPERACTIVE SYNDROME IN PRIMARY SCHOOL CHILDREN

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SUMMARY

Prevalence of hyperactive syndrome in 2160 primary school children between the age of 6-12 years was found to be 4.67%. The ratio of male, female distribution of hyperactive syndrome was found to be 4.74 : 1. It was significantly associated with type of school (only in girls), age (only in boys) and occupation of father (only in boys). Hyperkinetic behaviour of children was not significantly associated with income of parents. Family structure and dynamics of hyperactive children studied did not reveal gross pathology. Some of the hyperactive children were found to be impulsive in their cognitive style and others experienced difficulties in visuo-spatial perception and visuo-motor coordination.

The hyperactive syndrome in children was described in 1982 by Still (Laufer and Shetty, 1976). The syndrome was referred to as 'Organic Driveness' by Khan and Cohen in 1934. More recently it has been termed minimal brain damage, minimal chronic brain syndrome, hyperkinetic behaviour syndrome & minimal brain dysfunction (Cantwell, 1978).

The hyperactive syndrome has been recognised as one of the major public health problem in a number of Western countries. Wender (1971) has put on record that the frequency of this syndrome is so high that a child should be presumed to have the diagnosis of minimal brain dysfunction until proved otherwise. The prevalence of syndrome is difficult to specify, since it varies greatly with the diagnostic criteria employed, the population of children studied and method of investigation. Epidemiological studies which use rating scales tend to give higher prevalence rates than those studies which use direct observation or the studies that require the child to demonstrate hyperactivity in an interview setting. Some studies of school age population (Prechtl and Stemmer, 1962 ; Stewart *et al.*, 1966 and Huessey, 1967) gave a prevalence figures of 5-20 percent. The prevalence of this disorder may be linked to sex of the child (Male, female ratio varying from 4 : 1 to 9 : 1) and social class, it being more frequent among the disadvantaged children (Paine, 1962 and Werry, 1968).

The typical patient is hyperactive, emotionally labile, impulsive and has short attention span. Such children might display specific learning disabilities of developmental nature because of which their school work is poor and they are difficult to discipline. They tend to over react to frustration and frequently show conduct disorders of aggressive nature (Laufer and Denholf, 1957 ; Clement and Peters, 1962 ; Paine, 1962 ; Eisenberg, 1966 ; & Cantwell, 1978). The hyperactive syndrome may be produced by adverse psycho-social experiences. The psychogenic hyperactive child shows some direction and intention in his aggression and impulsivity. In such a child it is possible to observe certain structure and co-ordination in various aspects of his behaviour. In contrast a child suffering from organic hyperactive syndrome shows erratic motor activity without direc-

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tion and purpose. The activity is ceaseless and without change in school, home or any other social setting. The child's aggressivity and impulsivity are also without goal and apparently senseless. These children might also show sign of brain damage in the form of mild neurological deficits like choreoathetotic movements, mild tremor, mild nystagmust or a moderate neuro-muscular instability. Their electro encephalogram might be abnormal. On psychological test batteries these children display varying degrees of perceptual and cognitive dysfunctions (Conners *et al.*, 1967 and Cantwell, 1972).

The present study was conducted with the aim of (*a*) identifying hyperactive children in primary school population and (*b*) to study the phenomenology of hyperactivity syndrome for establishing the etiological diagnosis with the help of medico-psycho-social history, physical examination and psycho-metric evaluation.

METHODOLOGY

Sampling

The universe of the study was the primary school children in Delhi. The sampling unit was a primary school and the sampling frame consisted of all schools having primary section in the defined area of study. Stratified cluster method of sampling was used. Table 1 shows the number of children in each stratum specified for the study.

TABLE I—*Distribution of Sample Children stuaied according to Type of School and Sex*

Strata	No. of Children
Public/Private Schools :	
Boys	509
Girls	805
Total	1314
Govt./Municipal School :	
Boys	321
Girls	525
Total	846
Grand Total	2160

Construction of the Instrument

From the review of literature a comprehensive symptom check-list of emotional disorders among children was prepared (Knobel, 1962 ; Conners *et al.*, 1967 ; Conners, 1969 and Satterfield *et al.*, 1972). To this symptom check-list a few items characteristic of hyperactive syndrome reported in the child guidance clinic of the hospital were also added. The symptom check-list so prepared consisted of 42 items (Appendix I). It included symptoms not just characteristic of hyperactive syndrome but of the total spectrum of emotional disorders of children. This check-list was given to 10 teachers from Government and Private schools. This was done to see whether teachers were familiar with the Psychiatric symptomstology and also to find out difficulties experienced by the teachers and the research workers, in its administration. The teachers found the list long and time consuming. They expressed their inability to comment on some of the symptoms listed and pointed out some items which were not understood by them. On the suggestion of these teachers and also keeping in view the objectives of the present research scheme a new symptom check-list was prepared. This check-list had only sixteen items, all of which were representatives of hyperactive behaviour (Appendix I-items with asterisk mark). Four teachers from a Hindi medium government school were requested to use this symptom check-list for rating children from their classes and also to comment on the format of the symptom check-list. The teachers found the list comprehensive and could easily fill in the symptom check-list for each child within five minutes. Eighty three children were rated by these four teachers. The mothers of eight children who scored more than 7 points on the symptom check-list were interviewed. Three mothers of those children who scored 7 points on the symptom check-list were interviewed.

Three mothers of those children who scored eight points on the symptoms check-list agreed to the presence of behaviour problem in their children. Two mothers of children who scored 8 points and all the three mothers of those children who scored 7 points on the symptom check-list denied as to the presence of behaviour problems in their children. From this experience and also from the fact that presence of 50% of the symptoms is considered to be a criterion, it was decided to keep eight as the cut off point for labelling children hyperactive and studying them in greater detail.

Data Collection

The class teachers were requested to fill in the symptom check-list for each child from their classes included in the study. The symptom check-lists were then rated by the research worker and all the children getting eight or more points were studied in detail. A home visit was made to get information on family's educational status assessment of relationship between the parents, between parents and the index child between the index child and other sibs, disciplining techniques used by parents, birth history of the index child, past physical and psychological disorders and his school performance. These children were administered Sanguin form board test, colour cancellation test and Bender Gestalt test for assessment of intelligence, attention and concentration and visual perception and visuomotor co-ordination.

RESULTS

Out of the total sample of 2160 children, 101 were found to be having a score of 8 or more on the symptom check-list thus forming a prevalence rate of hyperactive syndrome of 4.7% percent (Table 2). The ratio of the prevalence of hyperactive syndrome in boys and girls was 4.47 : 1.

The prevalence rate of hyperactive behaviour in those children studying in government schools was 3.7% and the corresponding figure for those studying in private schools was 5.3% (Table 2). This difference was statistically not significant. The difference in the prevalence rates of hyperactive syndrome in boys studying in government schools (8.4 %) and in private schools (9.4 %) was not significant but a significant difference ($P<0.05$) in case of girls (0.7% and 2.7% respectively for government and private schools) was seen. In both government and private schools the prevalence rate in boys was significantly higher ($P<0.001$) than in girls (Table 2).

TABLE 2—*Prevalence of Hyperactive Syndrome by Type of School and Sex*

Type of School	Male		Female		Total	
Govt. School	27	(8.4)	4	(0.7)	31	(3.7)
Public Schools	48	(9.4)	22	(2.7)	70	(5.3)
Total ..	75	(9.0)	26	(1.9)	101	(4.7)

Figures in parentheses indicate percentage.

The hyperactive syndrome in children was significantly associated with age only in boys. The highest prevalence of 14.7% was seen in the age group of 10-11 years, the other three age groups showing comparable figures of 6.3%, 6.6% & 7.9% (Table 3).

In girls though hyperactive syndrome was not significantly associated with age, the critical ratio was very near to the significance level at 5%. The highest prevalence rate was observed in the age group 6-7 years (4.5%) and no case was reported in the age group of 12 years and above. In the other two age groups the figures were 1.3% and 3.0% (Table 4). Hyperkinetic behaviour was found to be significantly associated with father's occupation in boys ($P<0.05$). The highest percentage of boys having hyperkinetic behaviour was seen in those whose fathers were in business

TABLE 3—*Distribution of boys according to age & total score*

Age Groups (Years)	Total score on symptom check list						Total	Hyper-kinetic (score 7, 8)
	0	1—4	5—7	8—10	11—13	14—16		
6-7	54 (44.6)	50 (41.3)	9 (7.5)	6 (5.0)	1 (0.8)	1 (0.8)	121 (100.0)	8 (6.6)
8-9	165 (41.8)	171 (43.3)	34 (8.6)	21 (5.3)	4 (1.0)	..	395 (100.0)	25 (6.3)
10-11 ..	83 (33.1)	99 (39.4)	32 (12.7)	20 (8.0)	16 (6.4)	1 (0.4)	251 (100.0)	37 (14.8)
12 & above ..	28 (44.4)	26 (41.3)	4 (6.3)	5 (8.0)	..	..	63 (100.0)	5 (8.0)
Total ..	330 (39.8)	346 (41.7)	79 (9.5)	52 (6.3)	21 (2.5)	2 (0.2)	830 (100.0)	75 (9.0)

Figures in parenthesis indicate percentage.
$X^2=14.37$, d.f.=3, $p<0.01$

TABLE 4—*Distribution of girls according to age & total score*

Age (Years)	Total score on symptom check list						Total	Hyper (score 7, 8)
	0	1-4	5—7	8—10	11—13	14—16		
6-7	55 (49.1)	42 (37.5)	10 (8.9)	4 (3.6)	1 (0.9)	..	112 (100.0)	5 (4.5)
8-9	356 (58.9)	222 (36.2)	28 (4.5)	6 (1.0)	2 (0.3)	..	614 (100.0)	8 (1.3)
10-11 ..	270 (53.8)	195 (38.8)	24 (4.8)	13 (2.6)	..	..	502 (100.0)	13 (2.6)
12 & above ..	51 (50.0)	43 (42.2)	8 (7.8)	..	..	..	102 (100.0)	..
Total ..	732 (55.0)	502 (37.8)	70 (5.3)	23 (1.7)	3 (0.2)		1330 (100.0)	26 (1.9)

Figures in parentheses indicate percentage.
$X^2=7.64$, d.f.=3, N.S.

(13.5%) followed by those whose father's were cultivators/lab urers (8.4%) (Table 5). In those whose father's were professionals or administrators, the figures were comparable (5.7% and 6% respectively). The distribution of girls according to father's occupation followed a different pattern as the prevalence rate ranged from 0.6% in those whose father's were cultivators/ labourers to 3.1% in those whose father's were professionals (Table 6). Association between these variables were not statistically significant. Income of parents was not found to be significantly associated with

TABLE 5—*Distribution of boys according to father's occupation and total score*

Father's occupation	Total score symptom check list						Total	Hyper-kinetic (Score 7, 8)
	0	1—4	5—7	8—10	11—13	11—16		
Professional ..	73 (41.9)	73 (41.9)	18 (10.3)	9 (5.2)	1 (0.6)	..	174 (100.0)	10 (5.8)
Administrative ..	51 (44.3)	50 (43.5)	7 (6.1)	3 (2.6)	4 (3.5)	..	115 (100.0)	7 (6.1)
Business ..	73 (29.9)	112 (45.9)	26 (10.7)	22 (9.0)	9 (3.7)	2 (0.8)	244 (100.0)	33 (13.5)
Cultivators & Labourers ..	133 (44.8)	111 (37.4)	28 (9.4)	18 (6.1)	7 (2.3)	..	297 (100.0)	25 (8.4)
Total ..	330 (39.8)	346 (41.7)	79 (9.5)	52 (6.3)	211 (2.5)	2 (0.2)	830 (100.0)	75 (9.0)

Figures in parentheses indicate percentage.
$X^2=9.69$, d.f.=3, $p<0.05$.

TABLE 6—*Distribuiton of girls according to father's occupation & total score*

Occupation	Total score on symptoms check list						Total	Hyper-kinetic (Score 7, 8,)
	0	1—4	5—7	8—10	11—13	14—16		
Professional ..	137 (61.7)	62 (27.9)	16 (7.2)	6 (2.7)	1 (0.5)	..	222 (100.0)	7 (3.1)
Administrator ..	224 (53.3)	162 (38.6)	22 (5.2)	10 (2.4)	2 (0.5)	..	420 (100.0)	12 (3.0)
Business ..	207 (59.3)	122 (35.0)	15 (4.3)	5 (1.4)	..	..	349 (100.0)	5 (1.4)
Cultivators & Labourers ..	164 (48.4)	156 (46.0)	17 (5.0)	2 (0.6)	..	..	339 (100.0)	2 (0.6)
Total ..	732 (55.0)	502 (37.8)	70 (5.3)	23 (1.7)	3 (0.2)	..	1330	26 (5.0)

Figures in parentheses indicate percentage.
$X^2=7.4$, d.f.=3, N.S.

hyperactive syndrome in both boys & girls.

The education of the parents of these children did not reveal any deviation from the pattern of distribution of the educational status in general in Delhi. Similarly the family structure of these children did not show any abnormality as most of the children came from nuclear families with 4-6 members. Out of a total of 85 children only 3 children had the status of being the only child.

All the children were wanted by the parents and no parent had made any attempt to terminate the pregnancy, though in one case the child was conceived after tubectomy had been performed. The mothers of all the children gave the history that pregnancy, delivery and birth weight of them were normal. Neonatal period and infancy were uneventful. A small number of children showed other behaviour problems like reading and writing difficulty (2), stealing (3), telling lies (4), truancy, (1), excessive talking (1) and night terrors (2).

Attention span was tested in these children with the help of colour cancellation test in terms of time taken and number of errors committed. On applying Wilcoxon's non-parametric test it was found that the time taken on an average was comparable in normal & hyperkinetic children in all the age groups except the group of 8 yrs. and 11 yrs, where the average time taken was more in the former than the latter group. On applying the same test it was found that the number of errors committed on an average was significantly more in hyperkinetic children as compared to normal in all age groups except in the age group of 7 yrs (Table 7).

On Bender Gestalt Test, it was observed that in all the age groups hyperkinetic children scored comparatively higher values on an average than the forms given by Koppitz (Table 8). The difference was more pronounced from 7 yrs. onwards. On an average the difference in values was statistically significant in the age group of 7, 8 and 9 years. In the other age groups, statistical test was not done either because of small sample size of hyperkinetic children or because of the difference in age grouping.

No significant change in the family environment was reported by any of the parents contacted. Only 2 mothers reported the presence of chronic and sever

TABLE 7—*Performance of normal & hyperkinetic children on colour cancellation test*

		Total Score						
	Age/years	6	7	8	9	10	11	12
	No.	34	59	98	133	101	71	48
Time								
Normals ..	Mean ..	10.81	8.14	7.47	7.30	6.78	6.00	6.77
	S.D. ..	8.78	2.72	4.01	3.69	3.09	2.51	1.98
		2	10	11	16	27	20	5
Hyperkinetic ..	Mean ..	..	7.60	6.97	6.37	5.85	5.14	6.23
	S.D. ..	..	1.88	3.31	2.60	1.75	1.47	3.65
Errors ..	No. ..	34	59	98	133	101	71	48
Normals ..	Mean ..	7.90	10.20	6.67	7.45	5.88	6.35	0.89
	S.D. ..	5.55	6.90	5.76	5.17	5.58	6.23	4.75
		2	10	11	16	27	20	5
Hyperkinetic ..	Mean ..	..	11.75	22.82	40.38	18.56	18.10	29.20
	S.D. ..		8.96	20.73	41.87	17.29	24.0	13.18

TABLE 8—*Performance of expand score of normals and hyperkinetic children by age*

Age Group (Yr. Mths.)	Norms given by Koppitz (No.=1055)						Hyperactive children (N.=91)			Statistical Significance
	No.		Mean		S.D.		No.	Mean	S.D.	
6.0 to 6.5 ..	155	335	8.4	7.33	4.12	4.04	2	8.50	9.19	..
6.6 to 6.11 ..	180		6.4		3.76					
7.0 to 7.5 ..	156	266	4.8	4.76	3.61	3.49	10	8.67	4.53	$p<0.01$
7.6 to 7.11 ..	110		4.7		3.34					
8.0 to 8.5 ..	62	122	3.7	3.11	3.60	3.37	11	6.62	2.87	$0<0.01$
8.5 to 8.11 ..	60		2.5		3.03					
9.0 to 9.5 ..	59	104	1.7	1.57	1.82	1.66	16	7.18	3.24	$p<0.001$
9.6 to 9.11 ..	45		1.4		1.43					
10.0 to 10.5 ..			1.5		1.31		27	6.88	3.81	..
11 years ..	..	..					20	6.16	3.86	..
12 years ..							5	9.40	4.72	..

disharmony in the families and 13 mothers reported to be having normal adjustment with tensions at times. 70 mothers expressed to be having satisfactory marital adjustment. A significant finding of the study was that the fathers of hyperactive children were not involved in the rearing up of these children as they were too busy providing for the family. However, the mothers reported that they loved the index child as well as other children in the family but had not time for looking after the needs of the children. Only 2 monthers reported the indifferent attitudes of the fathers. Large number of mothers reported having normal affection for their children. Pathological attitudes of over protection, in difference or rejection were found only in a very small number of mothers (3). Excessive use of corporal punishment was not found, most parents used combinations of scolding, ignoring, explaining and beating for disciplining their children. The hyperactive children were found not to be having unusual rivalary towards their sibs. The relationship between the sibs was described by the mothers varying from moderate rival to loving and supporting. The hyperactive children were not loners as they mixed with other children of their age. Only 2 children were reported to be aggressive by mothers and these two children had scored 14+ points on the symptom check-list.

All the children started their schooling between 3-6 years and only those children who had scored more in the symptom check-list (i.e. 15-16 points) did poorly in studies.

DISCUSSION

There are a number of studies which suggest that hyperactive child syndrome may be a percursor of juvenile delinquency and adult criminal problems (Steward *et al.*, 1966 ; Menkes *et al.*, 1967 ; Mendelson *et al.*, 1971 ; Weiss *et al.*, 1971 ; Cantwell, 1972). An early detection of these children and their management with the help of stimulant medication, family counselling and special education will enable them to

better control their impulses and respond appropriately to their environment. For planning and implementing the mechanics of secondary and tertiary prevention of hyperactive syndrome it is imperative that we should know the extent and nature of the problem in India. The total prevalence of hyperactive syndrome in Delhi schools was found to be 4.7 which is nearly the same as reported in literature (Perchtl and Stemmer, 1962 ; Steward *et al.*, 1966 ; Huessey, 1967). The prevalence of hyperactive syndrome in boys was 9% uniformly distributed in both the government and public schools. This shows that the school teachers were not ignorant of the existence of the problem in the class room and they recognised deviant behaviour. The prevalence of hyperactive syndrome in girls was found to be 1.9% and the distribution of these girls was heavily skewed as 76.8% of these girls were from one public school. This finding highlights the fact that the recognition of hyperactive syndrome in children is dependent on the sensitivity and expectation of the teachers about the conduct of the children (Bolstad and Johanson, 1977). The ratio of the distribution of hyperactive syndrome in boys and girls when worked out from the raw data comes to 4.74 : 1. This is higher than what is reported in literature (Werry, 1968 ; Omenn, 1973). It seems that the high prevalence of hyperactive syndrome in girls in the present study is an artefact created by higher reporting from one public school.

The low prevalence of the hyperactive syndrome in girls has been attributed to a number of factors. It has been conjectured that undirected hyperactivity might to be less prominent as a symptom and resistance to socialisation may be a more salient feature in girls suffering from hyperactive syndrome (Wender and Eisenberg, 1974). It might be for this reason that the symptom check-lists of the type used can not pick up the hyperactive girls. Cultural factors fostering aggressive, boisterous behaviour in boys (Baldev *et al.*, 1972) have also been claimed to cause higher prevalence of hyperactive syndrome in male children. A significant finding of the study is that hyperactive syndrome is more prevalent in girls between 6-7 year of age and in boys between the age groups of 10-11 years. This might indicate that faster maturation might cause a rapid fall in the prevalence of hyperactive syndrome in girls. It might also be related to prevailing socio-cultural norms and child rearing practices which expect female children to be more conforming, shy, obedient, and submissive (Badlev *et al.*, 1972).

Detailed testing could not be done in the present study to establish etiology of hyperactive syndrome in each child because of the difficulties inherent in a field study. A sample of 91 children could be contacted for psychometeric evaluation and physical examination. Mothers of 85 children could be interviewed for medical and psychosocial history. The socio economic variables of these children regarding education, income of the parents, structure and size of the family were not significantly different from those seen in general in Delhi. The prevalence of hyperactive syndrome in boys was found to be significantly related to the father's occupation, being more common in children whose fathers were either in business or were cultivators/ labourers. This can be attributed to the difference in child rearing practices especially to the evaluation of the importance and role of academic education by different occupational strata in the achievement of life goals.

In the present study the occurrence to pathology in the psychosocial environment of the family does not appear to be so common as to be considered an important causative factor in the appearence of hyperactive syndrome. This finding is a contrast to what is generally seen and reported

from child guidance clinic studies (Cantwell, 1971 ; Baldev *et al.*, 1972 ; Chawla & Gupta, 1979). The reason for this discrepancy might be that the parents troubled and sensitised by their own problems perceive hyperactive syndrome of their children as a symptom and use it as an 'admission ticket' to seek help.

The hyperactive behaviour in 28 children in the present study was found to be associated with subaverage intelligence. Thirty six (36) boys and 4 girls were found to be impulsive in cognitive style on colour cancellation test. These children made a large number of mistakes. It has been reported (Campbell *et al.*, 1971 ; Sergeant *et al.*, 1979) that hyperactive children tend to respond immediately with little critical evaluation of the alternatives and this produces a negative relationship between response speed and accuracy. Hyperkinetic children in all the age groups scored higher on Bender Gestalt test than the norms given by Koppitz (1960) showing that these children experience difficulties in visuo-special perception and visuo-motor co-ordination. A very interesting finding of the study is that comparatively higher scores on B. G. tests are more pronounced in children from 7 years of age. It can be postulated that the children who experience cognitive and perceptual difficulties conitnue to manifest hyperactive syndrome in middle and late childhood as they are difficult to discipline and are impervious to the usual socializing practices of the family.

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