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Original Research Article

Study of socio-demographic factors and comorbidities in children with attention deficit hyperactivity disorder admitted in a tertiary care centre

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ABSTRACT

Background: Objectives of the study were to study the socio-demographic factors and co-morbidities in Indian children with attention-deficit/hyperactivity disorder (ADHD).
Methods: A prospective observational study of 2 years duration at the pediatrics department, Rural tertiary care center in Tamil Nadu, using diagnostic and statistical manual 5 (DSM-5) criteria-based questionnaires.
Results: 60 children met the diagnosis of ADHD. M: F ratio was 3.6:1. The mean age was 8.2 years. A majority of the children belonged to lower socio-economic classes and were first-born children. Most children were brought up in nuclear families. A history of delayed speech and language development was commonly seen in these children. The combined type of ADHD was the most common. At least two co-morbid diagnoses were seen in most of the children, and anxiety disorder was the most common co-morbid diagnosis.
Conclusions: Knowledge about their sociodemographic profile and other co-morbid conditions that are associated with ADHD is necessary to the fully understand the magnitude of the problem and to the plan effective therapy for them.

Keywords: ADHD, Socio-demographic factors, Co-morbidities, Risk factors

INTRODUCTION

Attention deficit /hyperactivity disorder (ADHD) is common neurobehavioral disorder affecting children causing significant limitations in functioning across different settings.[1] the affected children exhibit varied behavioral patterns depending on type of it, co-morbidities, type of care they receive. Parents of these children also face varying degrees of stress and disharmony at home. Objectives of the study were to analyze socio-demographic factors, as well as the comorbidities in children with attention deficit /hyperactivity disorder admitted to tertiary care center, in Tamil Nadu.

METHODS

Institutional Ethical committee approval was obtained before the start of the study. Informed written consent and assent were obtained from the parents of the study.

A prospective observational study of 2 years duration was conducted from December 2020 to December 2022 at Govt. Cuddalore medical college and hospital, Tamil Nadu. All the children were diagnosed with ADHD based on the Diagnostic and statistical manual of mental disorders-5 (DSM-5) criteria in two different settings. Children who satisfy DSM-5 criteria, but were found to have less intelligence quotient (<70) IQ, children with

gross neurological abnormalities, visual and hearing loss, epilepsy, autism, and other pervasive developmental disorders were excluded from the study.[2]

A Convenient sample of 60 children aged between 6 and 12 years with features of ADHD for at least 6 months was enrolled and subjected to a detailed and structured interview, using a structured, pretested questionnaire, focusing on maternal risk factors, delivery details, birth weight, developmental history, history suggestive of co-morbid disorders, type of family, socioeconomic status, based on the revised Kuppuswamy scale, siblings, birth spacing, etc.[3] After a thorough history, a detailed examination was carried out, with particular attention to dysmorphology examination, neurological examination, and soft neurological signs. An interview related to common co-morbid disorder was then conducted based on initial history using structured questionnaires based on DSM-5 TR criteria in conjunction with a psychiatrist. Then the children were administered the Vanderbilt assessment scale with advice to parents to fill in the forms in conjunction with the school teacher, to avoid discrepancies. During the next visit, the parents reviewed back with the reports. They were also screened for anxiety disorder, conduct disorder, and learning disability (LD) with self-administered tests which were appropriate for their age and educational level. The LD was classified based on DSM-5 as a reading, writing, or mathematical disorder. A diagnosis of language disorder and social communication disorder were also considered based on DSM-5 criteria in conjugation with the psychiatrist. The results were tabulated and statistical analysis was done using SPSS Software version 20.

RESULTS

The study was conducted among the study population between December 2020 to December 2022 in the department of pediatrics, govt. Cuddalore medical college, Chidambaram. 60 children met the inclusion criteria for diagnosis of ADHD. Out of the 60 participants with ADHD included in our study, Inattention type was present in 28.3%, Hyperactivity was present in 18.3% and Combined type was present in 53.3%. The 25% of the children were of 6 and 8 years of age, respectively and 16.6% were of 9 years of age followed by 11.7% who were of 7 and 11 years. The mean age among the participants was 8.20±1.81 years. For those diagnosed with inattention, hyperactivity, and combined ADHD, the mean age was 8.94±1.63 years, 8.36±1.56 years, and 7.75±1.88 years, respectively. Out of the 60 children with ADHD, 47 (78.3%) were boys and 13 (21.7%) were girls with a ratio of 3.6:1. Fifty-four (90%) children were having complaints of diminished attention span which is followed by forgetfulness at 86.7%. Thirty-three (55%) have all four complaints. Twenty-six (43.3%) children whose parents have higher education qualification was diagnosed. The proportion of parents working as laborers was more in the combined group. There was no association between per capita income and the type of ADHD. Thirty-three (55%) children from the lower socio-economic group were diagnosed with ADHD. The sociodemographic characteristics of the study population are given in (Table 1). Twelve (20%) children were born out of consanguineous marriage. Thirty-five (58.3%) children were first born on a sibship. Thirty-one (51.6%) had a birth spacing of less than one year. Forty-one (68.3%) were preterm Eighteen (30%) children had low birth weight (LBW). Forty (66.7%) children were living in a nuclear family type. Nineteen (31.7%) children had one or more maternal risk factors. Delayed attainment of language milestones was the most common and was seen in 34 (56.6%) children. Only 1 (1.9%) child had delayed development of all four milestones. Nineteen (55.8%) children with language delay were 6-8 years of age (Table 2). The most common type of ADHD in our study was the combined type (CT) of ADHD which was seen in 32 (53.3%) children (Figure 1). The 17 (28.3%) children had Inattentive (IA) type of ADHD. Hyperactivity type was seen in 11 (18.3%) children. Inattention was the most common type among girls 7(41.2%), whereas combined type was the most common type among boys 28 (87.5%).

Table 1: Socio-demographic characteristics among the study population, (n=60).

Variables	N	Percentage (%)
Parent's education		
None completed HSC	12	20
One completed HSC	22	36.7
Both completed HSC	26	43.3
Family income (INR)		
≤6174	33	55
6175-18496	9	15
18497-30830	17	28.3
30831-46128	1	1
Socio-economic status*		
Upper	0	0
Upper middle	1	1.17
Lower middle	17	28.3
Upper lower	9	15
Lower	33	55

Continued.

Variables	N	Percentage (%)
Location		
Rural	42	70
Urban	18	30
Type of family**		
Nuclear	40	66.7
Joint	20	33.3
Type of delivery		
NVD	41	68.3
LSCS	19	31.7
Maternal risk factors		
Gestational DM	10	16.7
Hypothyroidism	6	10
PIH	3	5
Other	41	68.3
Consanguinity		
First degree	0	0
Second degree	6	10
Third degree	6	10
Non-consanguinity	48	80
Birth order		
1st	35	58.3
2nd	21	35
3rd	3	5
4th	1	1.7
Gestational age (Weeks)		
Preterm	41	68.3
Term	18	30
Post-term	1	1.7
Siblings		
NIL	4	6.7
1	44	73.3
2	11	18.3
3	1	1.7
Birth space		
Not applicable	4	6.67
<1 year	31	51.6
1-2 years	13	21.7
>2 years	12	20
Birth weight (Gm)		
Low (>2500)	18	30
Normal (<2500)	42	70

Table 2: Number of comorbidities in ADHD and their percentages, (n=60).

Variables	N	Percent (%)
Number of comorbidities in ADHD		
One	12	20
Two	16	26.67
Three	13	21.67
Four	11	18.33
Five	2	3.33
Disorder		
Learning disorder	26	43.33
Communication disorder	24	40
Language disorder	21	35
Anxiety disorder	52	86.66
Conduct disorder	13	21.67

Table 3: Comorbidities in ADHD subtypes.

Subtypes	Total	Comorbidities	Percentage (%)
Inattention	17	14	23.33
Hyperactivity/impulsivity	11	10	16.67
Combined	32	30	50
Total	60	54	90

DISCUSSION

In our study, 28.3% were diagnosed to have inattention type, 18.3% were diagnosed to have hyperactivity type of ADHD and 53.3% were diagnosed to have a combined type which is similar to the previous studies done by Antony et al, Pingali et al and Al-Sharbati et al in which the most common subtype was the combined subtype (60,71.3,67.9%) followed by the inattentive subtype (60,21.3,67.9%) and hyperactive-impulsive type (13,7.5,11.8%) respectively.[4-6] The mean age among the participants diagnosed with inattention type was 8.94±1.63 years, for hyperactivity type it was 8.36±1.56 years and for the combined variety it was 7.57±1.88 years. This is consistent with that of several studies in which ADHD was found to be highest with a mean age between 8 to 9 years. Male to Female ratio of ADHD in this study is 3.6:1. This is similar to that of previous studies which identified a similar gender difference i.e., the male predominance, with the ratios ranging from 10:1 in a clinically referred sample and 3:1 in a community sample. Diminishment of attention span, forgetfulness, restlessness, and impulsiveness were the four different complaints reported by the study participants. Out of the most (90%) reported to have a Diminished attention span followed by 86.7% Impulsiveness. We find that the educational qualification of parents and age of parents are not significant risk factors for ADHD. Similar observations have been reported in Venkatesh according to which there was no correlation between ADHD, parental education, profession, or income.[7] In our study, ADHD is more common in children from lower socioeconomic groups Which is similar to a previous study done by Venkata et al reported a high prevalence of ADHD in lower socioeconomic status than middle and upper socioeconomic status.[8] ADHD is more common in children from rural areas which is not consistent with a previous study done by Venkata et al reported a high prevalence of ADHD in the urban area. ADHD is more common in children from nuclear families Which is similar to a previous study done by Venkatesh reported behavioral problems have been reported to be high in Indian children belonging to nuclear families.[7,8] Similarly, our study also found ADHD to be more common in children belonging to nuclear families. ADHD is more common in children delivered by normal vaginal delivery which is not similar to a previous study done by Antony et al reported a high prevalence of ADHD in children delivered by LSCS.[4] 20% of participants were born out of a consanguineous marriage and in the attention, hyperactivity, and combined groups the proportion was 11.8%, 9.1%, and 28.1%, respectively. There were no studies to compare. Maternal complications and consanguineous marriage among parents were not found to be associated with ADHD in our study. The proportion of participants with birth order 1 was significantly more in the combined group than in inattention or hyperactivity ADHD which is consistent with a previous study done by Marin et al reported the firstborn child to have twice as increased risk of ADHD than the rest of the siblings.[9] 73.3% of participants had at least one sibling and 18.3% had two siblings. There were no studies to compare. The number of siblings and type of ADHD was not found to be associated with each other in the present study. 58.3% were born after birth spacing of less than 1 year. In the inattention group, 29.4% were born after birth spacing of less than 1 year and in the hyperactivity group, the proportion was 45.5%. The 78.1% were born after birth spacing of less than 1 year in the combined group. Birth spacing of less than one year was found to be associated with combined ADHD. This is similar to Postava et al reported that participants with low interpartum intervals had an increased risk of ADHD.[10] When the intrapartum interval was between 24 to 59 months the risk was 1.3 times. 28.3% of participants had a birth weight between 1.5 to 2.5 kg and 1.7% had a birth weight of fewer than 1.5 kg. This is similar to Venkatesh.[7] The 17.6% children were delivered prematurely and had low birth weights. 56.6% lacked language skills, 18.3% participants lacked social adaptability, 15% participants had a gross motor delay and 10% had a fine motor delay. This is similar to Venkatesh.[7] Thirty-two (62.7%) children had a history of delayed attainment of one or more milestones in which delayed attainment of language milestones was the most common and was seen in 30 (58.8%) children. 90% of participants were found to have at least one comorbidity. 86.6% had an anxiety disorder, 43.3% learning disorder, 40% communication disorder, and 35% had a language disorder. The 25% had two comorbidities and 20% had one comorbidity. Pingali et al reported the proportion of comorbidities to be 52.9%.[5] The study reported anxiety disorder to be the most common comorbidity followed by learning disorder.

Limitations

Children from rural areas were predominantly studied.

CONCLUSION

ADHD is a highly prevalent neurobehavioral disorder in children with marked heterogeneity in clinical

presentation. There is a high incidence of LD with other co-morbid mental health problems in these children which may have a negative influence on their behavior. Identification of these co-morbidities would help in planning effective and comprehensive treatment strategies for them.

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