

Research Paper

Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

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ABSTRACT

Introduction: Attention deficit hyperactive disorder affects children in a school going age group. It is characterised by neurobehavioural disorder with hyperactivity, inattention, and impulsiveness and slow learning. The familial environment plays a great role in the development of ADHD. **Materials and methods:** 42 children between the age of <1 to 10 years who came to the psychiatric department with the symptoms of ADHD were included into the study. After a thorough physical and clinical examination to rule out other illness of the child, a predesigned questionnaire was used to assess the ADHD. The child's age, date of birth, birth weight, delivery date, whether preterm, or post term was noted. Other familial details such as the economic status, nature of the family, smoking and alcohol status of the mother during pregnancy etc were also noted. **Results:** Most of the children in the study (61.9%) were between the age of 5-9 years, while 31% less than 5 years. 69.1% of the patients belonged to the lower socioeconomic group, while 30.9% belonged to the middle class. 73.8% of the patients lived in nuclear family. 42.9% of the children had both the parent working, while 35.7% had parents with irregular or occasional work and not a steady job. 28.6% patients had a close family member with ADHD. 9.5% of the mothers smoked during their pregnancy and 21.4% consumed alcohol. 64.3% were preterm and 33.3% had low birth weight. **Conclusion:** Children who have been exposed to environmental risk factors such as preterm birth, low socioeconomic status, parents with early marriages, mothers consuming alcohol and smoking during pregnancy and those with a familial history of ADHD are more at risk to get ADHD. Therefore, and early detection can aid in timely intervention to improve the quality of life of the child as well as the family.

Keywords: Attention deficit hyperactive disorder, Low economic status, children, developmental delay

During the early childhood, certain skills such as cognitive, motor, language vision and social skills are acquired by the child. Many of these are age specific, that is the child attains some of these at certain age¹. However, these acquisitions varies form

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Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

child to child^{2,3}. This is not only due to the familial genes but also due to the social and physical environment that plays a role in the development of the child's brain⁴.

Attention deficit hyperactive disorder affects children in a school going age group. It is characterised by neurobehavioural disorder with hyperactivity, inattention, and impulsiveness and slow learning. It is normally seen to set before 7 years of age and is seen in about 5% of the children globally⁵. Among the children in US, the rate is around 12 – 16% and in Indonesia it is estimated to be around 13-18%^{6,7}. ADHD has been known to persist till adulthood and is seen to affect 1 to 4% of the adults with reduced quality of life⁸⁻¹¹. Boys are seen to be three times more affected with ADHD than girls¹². The prevalence rates among the adolescents is around 2.2% to 9.9%¹³. The children with ADHD find it difficult in school and among social gatherings, leading to undesirable outcomes in adolescence and adulthood^{14,15}.

The familial environment plays a great role in the development of ADHD. ADHD in children has been linked to marital discord of the parents, low socioeconomic status, lower education among the parents, lower cohesion of the family, authoritative parenting, including punitive, non-intact nuclear family, etc¹⁶⁻¹⁸. Low self esteem, peer pressure, poor academic achievement, failure to perform well in school also were added conditions for persistence of ADHD¹⁹.

Cognitive and socio-emotional developments in the children are strong predictors of poor academic performance in the later ages. Therefore identification of these characters in the early stages may help in intervention early the that the quality of life of the child is improved²⁰. Interventions can be a caregivers stimulation and interaction or it can be with medications to prevent malnutrition²¹.

This study was therefore conducted to assess type of ADHD and developmental delay among children and the factors leading to it.

MATERIALS AND METHODS

This study was done by the department of Psychiatry at Mallareddy medical college for women during the period of One year i.e., July 2020 to June 2021. 42 children between the age of <1 to 10 years who came to the psychiatric department with the symptoms of ADHD were included into the study. This study was cleared by the Institutional ethical committee and the parents or guardians of the children were explained the nature of the study and informed consent was taken from them. Children with unclear background and orphans with no known familial history were excluded from the study.

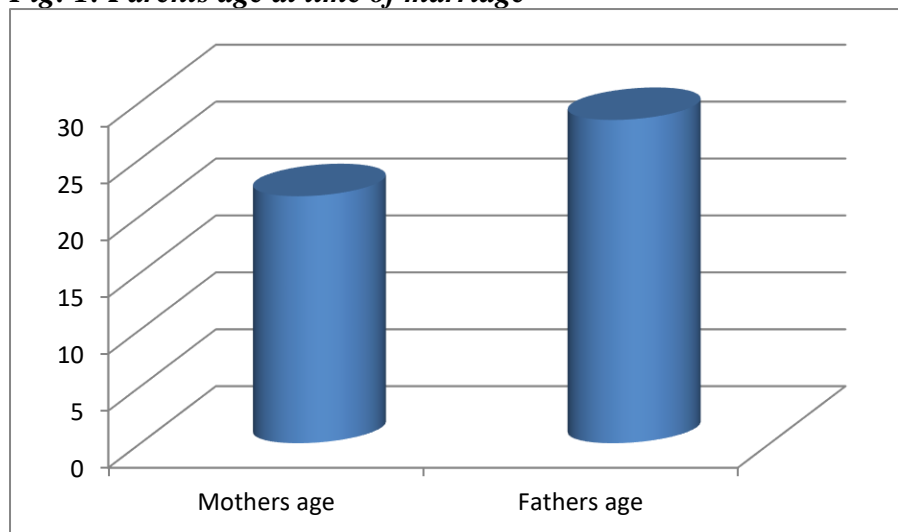
After a thorough physical and clinical examination to rule out other illness of the child, a predesigned questionnaire was used to assess the ADHD. The child's age, date of birth, birth weight, delivery date, whether preterm, or post term was noted. Other familial details such as the economic status, nature of the family, smoking and alcohol status of the mother during pregnancy etc were also noted.

All the collected data were entered into Microsoft excel and were represented as graphs and tables where necessary. Percentages were calculated and represented as above.

RESULTS

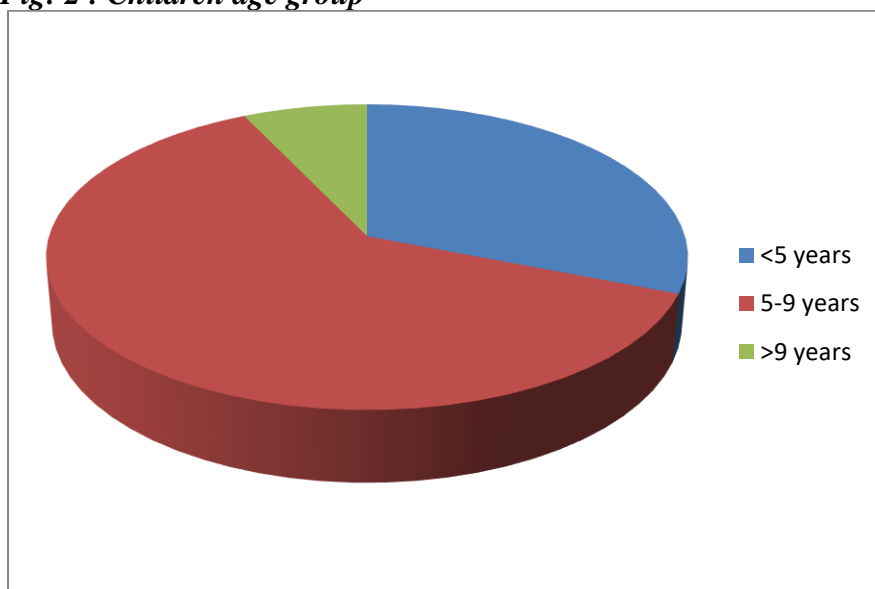
The mean age of the father at the time of his marriage was around 27 years while that of the mother was 21 years. The earliest age of the mother at the time of marriage was 16 years (Fig:1).

Fig: 1: Parents age at time of marriage



Most of the children in the study (26 -61.9%) were between the age of 5-9 years, while 13 (31%) less than 5 years. 3 (7.1%) were above the age of 9 years (Fig: 2).

Fig: 2 : Children age group



Out of the 42 cases, in 11 (26.2%) both the parents were uneducated, while 18 (42.9%) had atleast 1 parent educated upto 10.in 8 (19%). Both the parents were educated upto 10th standard, while in 1 (2.4%), both the parents were graduated. 29 (69.1%) of the patients belonged to the lower socioeconomic group, while 13 (30.9%) belonged to the middle class. 31 (73.8%) of the patients lived in nuclear family while 11 (26.2%) of them lived in joint families. 18 (42.9%) of the children had both the parent working, while 15 (35.7%) had parents with irregular or occasional work and not a steady job (Table: 1).

Table: 1: Familial Details

Family details	Number
Education of parents	
Both Uneducated	11 (26.2%)
One parent upto 10	18 (42.9%)
Both parents upto 10	8 (19%)
One parent graduate	4 (9.5%)
Both parents graduates	1 (2.4%)
Socioeconomic status	
Lower class	29 (69.1%)
Middle class	13 (30.9%)
Family status	
Joint	11 (26.2%)
Nuclear	31 (73.8%)
Working status	
Both parents working	18 (42.9%)
Single parent working	9 (21.4%)
Parents with no regular work or occasional work	15 (35.7%)

12 (28.6%) patients had a close family member with ADHD. It was generally a father or a brother. 4 (9.5%) of the mothers smoked during their pregnancy and 9 (21.4%) consumed alcohol during this period. 27 (64.3%) were born earlier than their due date and 14 (33.3%) having low birth weight. 9 (21.4%) of the mothers had hypertension during their pregnancies (Table: 2).

Table: 2: Risk Factors

Factors	Number (%)
Familial History	12 (28.6%)
Mother smoking during pregnancy	4 (9.5%)
Alcohol intake during pregnancy	9 (21.4%)
Preterm labour	27 (64.3%)
Gestational Hypertension	9 (21.4%)
Low birth weight	14(33.3%)

21 (50%) of the children below the age 5 years had language delay, 4 (9.5%) had Gross motor delay, 8 (19%) had fine motor delay and 5 (11.9%) had social and adaptive delay also. Language delay was the most common delay among the 5-9 years age group in 8 (19%) and in 2 (4.8%) in >9 years age group (Table: 3)

Table: 3: Developmental delay in different ages

Age	Language	Gross motor delay	Fine motor delay	Social and adaptive delay
< 5 years	21 (50%)	4 (9.5%)	8 (19%)	5 (11.9%)
5-9 years	8 (19%)	2 (4.8%)	2 (4.8%)	4 (9.5%)
>9 years	2 (4.8%)	0	0	1 (2.4%)

Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

8 (19%) of the children below 5 years of age, 15 (35.7%) between of 5-9 years age group and 2 (4.8%) of >9 years age group had the classic Attention deficit/Hyperactive Disorder. Of the children between 5-9 years, 9 (21.4%) of the children were inattentive, 2 (4.8%) were impulsively hyperactive, 9 (21.4%) had conduct disorder, 5 (11.9%) had anxiety disorder, 9 (21.4%) had Oppositional Defiant disorder, and 8 (19%) had Developmental coordination disorder. Among the children below 5 years age group, 4 (9.5%) were inattentive, 1 was hyperactive impulsive, 3 (7.1%) had conduct disorder, 2 (4.8%) had anxiety disorder. 30 (71.4%) children had learning disability (Table: 4).

Table:4: Type of ADHDs and other learning disorders

Neurological parameter	< 5 years	5-9 years	>9 years
Type og ADHD:			
Attention deficit/Hyperactive Disorder	8 (19%)	15(35.7%)	2 (4.8%)
Inattentive	4 (9.5%)	9 (21.4%)	1 (2.4%)
Hyperactive Impulsive	1 (2.4%)	2 (4.8%)	0
Conduct disorder	3 (7.1%)	9 (21.4%)	0
Oppositional Defiant disorder	2 (4.8%)	9 (21.4%)	0
Learning disability	9 (21.4%)	18 (42.9%)	3 (7.1%)
Anxiety disorder	2 (4.8%)	5 (11.9%)	1 (2.4%)
Developmental coordination disorder	3 (7.1%)	8 (19%)	1 (2.4%)

DISCUSSION

Like any other medical disorder, ADHD is also influenced by multiple genes or environmental factors and the association between the two²². Any of the causes may not result in ADHD, neither to exposure to any risk factor. Moreover, the factors that actually contribute towards ADHD may not be the one resulting in the disorder²².

In the present study, the average age of the mother a the time of her marriage was 21 years and that of the father was 27 years.

Males showed more predisposition to get ADHD than females in our study. Many literatures also showed more number of males to be affected with ADHD than females²³⁻²⁵. Bishry et al, in their study also reported a higher rate of affected amles than females with a male to female ration of 2:1²⁶. However, a study by Collins et al reported higher number of females to be affected by ADHD than males²⁷.

Most of the children under the study (62%) were between 5-9 years of age, 31% being less than 5 years and 7% were more than 9 years of age. In a study by , children between 8-12 years were more likely to be diagnosed with ADHD than any other age group²⁸.

Majority of the children (69%) belonged to the lower class strata while the rest were in the middle class. Several studies have reported low socioeconomical conditions, family adversity peer rejection to also be cause of ADHD^{29,30}. Bishry et al also in their study reported that most of the children with ADHD belonged to the low socioeconomic status²⁶. One of the plausible reasons for this was the negative impact that ADHD has on social and academic environments, therefore the families with ADHD may cluster together within the lower socioeconomic strata⁴³. Another explanation by Lee et al was that the people in the high socioeconomic levels tend to attend academics in places with lesser number of students

Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

with no clusters with highly structured educational settings, thereby limiting their symptoms⁴⁴.

26% of the children had a close relative with a mental disorder. Beiderman in his study in 2005 found that there was a two fold to 8 fold increase in the risk of ADHD in children with affected siblings or parents²³. Another study by Thapar et al reported that monozygotic twins had a higher concordance rates than dizygotic twins²⁴. Parents and siblings with mood problems, conduct problems, low reading ability, ASDs and other psychiatric problems also have a contribution of ADHDs among children²⁵⁻²⁷.

Around 21.4% and 9% of the children had mothers who consumed alcohol and smoked during pregnancy. A consistent association was found in prenatal exposure to cigarettes and alcohol and the offspring in a few studies^{30,31}.

33.33% of the children in our study had low birth weight. An association between low birth weight and ADHD symptoms was observed with a relative risk of 2.64^{32,33}. Some studies have also mentioned Intra Uterine Growth Restriction to be a cause for ADHD³⁴. Preterm deliveries also were associated with ADHD in our study as seen in 64.3% of the cases. This was similar to other studies where increased ADHD was seen among the preterm deliveries^{34,40,41}.

Of the types of ADHD, most of the patients (59.5%) had classic ADHD, while 33.3% were inattentive and 4.8% of them were hyperactive impulsive. In a study by Bishry et al, most of the patients were hyperactive impulsive and inattentive was the least common type of ADHD⁴².

Limitations of our study: The sample size was small in our study and there is a need for more research to be done in this field. The motor problems of these children also need to be extensively studied as children with both ADHD and motor problems tend to be more stressed than others.

CONCLUSION

Children who have been exposed to environmental risk factors such as preterm birth, low socioeconomic status, parents with early marriages, mothers consuming alcohol and smoking during pregnancy and those with a familial history of ADHD are more at risk to get ADHD. The most common type is the classic ADHD, followed by inattentiveness and impulsively hyperactive. Therefore, and early detection can aid in timely intervention to improve the quality of life of the child as well as the family.

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Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

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Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

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Risk Factors of Attention Deficit Disorder Among Children: A Study in A Tertiary Care Unit

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Conflict of Interest

The author(s) declared no conflict of interest.

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