Original Research Article

A Study to Assess the Prevalence of Attention Deficit Hyperactivity Disorder among School Children Attending Primary Schools in Tirupati, Andhra Pradesh, India

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ABSTRACT

Background: It is a general assumption that children do not suffer from psychiatric disorders. However, it has been observed that childhood psychiatric disorders are more common than expected in the general population. Many children suffer from attention deficit hyperactivity disorder (ADHD), which is defined as a persistent pattern of inattention or impulsivity that is formed during growth. It is manifested in two or more contexts (e.g., at home, school or work) and negatively affects the individuals social, academic or occupational functioning. Early identification and intervention of these problems are very important to address issues at early age. The present study was aimed to assess the prevalence of ADHD among school children (7 to 11 years).

Objectives:
- To assess the prevalence of Attention Deficit Hyperactivity Disorder among school children studying in primary schools, Tirupati.
- To compute the level of attention (inattention) and behavior (hyperactivity) of children with ADHD.
- To find an association between level of attention and behavior with selected demographic variables.

Methodology of the study: Cross sectional survey approach, of which a time-dimensional research design, which is a type of descriptive study design was used. It was planned to conduct the study in primary schools of selected urban areas in Tirupati. The population were school going children (7 to 11 years), studying in primary schools of selected urban areas, Tirupati. The samples were identified as having features of ADHD based on patent and teacher's data by applying SNAP- IV TEACHER and PARENT RATING SCALE.

Results: Findings of the study shown that among 403 school going children (7 to 11 years), 24 (5.9%) identified as having features of ADHD either of inattention, hyperactivity or ADHD-combined type; among 24 (5.9%) identified children, 22 (5.45%) identified as ADHD-combined type; one child (0.24%) identified as ADHD-inattention type and one child (0.24%) identified as ADHD-hyperactive type.

Conclusion: Results of the study confirm the existence of ADHD among the school children (7 to 11 years) in the study population, which clearly states that ADHD- combined type is more predominant than other sub types of ADHD. The boys, girls' ratio found to be 2:1. Analysis also revealed that there was a significant association between prevalence of ADHD and its subtypes with selected demographic variables such as type of residence, type of school, history of eventful pregnancy and religion at 0.05 level of significance.

Key Words: ADHD, Prevalence, Primary school

INTRODUCTION

Children need love, especially when they do not deserve it

-Harold Hulbert

Studies in different settings have shown that around 46% of Indian population are children, 74 % of them live in rural areas characterized by heterogeneity in respect of physical, economical, social and cultural conditions. [1] According to the WHO statistics, prevalence of disabling mental illnesses among children and adolescents attending urban health care centers ranges between 20-30% and 13-18% in rural areas. Out of these children 3-4% is suffering from serious mental illnesses and requires treatment. Western studies have shown prevalence of 10-12%. Most studies from developing countries reported higher prevalence rates for psychiatric problems in children and adolescent than those in western countries. Common psychiatric problems reported among children were Attention deficit hyperactivity disorder (ADHD), Oppositional defiant disorders, Conduct disorders, Psychosomatic disorders, Anxiety and Elimination disorders. [2]

ADHD is one of the most frequent psychiatric illnesses reported in the psychiatry clinics. It is defined as a 'persistent pattern of inattention, hyperactivity and impulsiveness that is pervasive and inappropriate for the developmental level' (APA 2000). [3,4] It is a complex disorder with neurological and genetic factors comprising a sound but still unproven explanation for the cause. It has profound effects at the individual, family, school, and societal levels. [5, 6]

ADHD as we now know is not new. It has been around for many years under different definitions and terms. Children exhibiting the symptoms of ADHD were observed and documented in the mid 1800s, with symptoms noted as appearing after central nervous system damage or disease. [7] However, the first well documented descriptions of the disorder and attempt to understand and explain the symptoms occurred in England in 1902 when George Still labeled the set of behaviors as "defects in moral control", he described those affected with the disorder as aggressive, defiant, resistant to discipline, highly emotional, evidencing little self-control, with many of his sample also exhibiting excessive activity and poor sustained attention to task. [8]

ICMR Division of Non-communicable Diseases conducted a Multi-centre project and reported in the age group 0-5 years; maximum number of children (33%) had diagnosis of hyperkinetic syndrome. The common diagnoses in age group 6-11 years were: hysterical neurosis, hyperkinetic syndrome and conduct disorders. [9]

Children under 16 years of age constitute over 40 percent of India's population and information about their mental health needs is a national imperative. From the early 1960s, there have been efforts at conducting epidemiological studies in community, clinic and school settings. Community surveys have the advantage of being more representative. This small group of community-based studies provides some benchmarks for the rates of psychiatric disturbances among Indian children. [10]

MATERIALS & METHODS

Research Approach

It was a Survey research approach which is usually used to obtain information about the prevalence, distribution, and interrelations of variables within a population [11]

Research Design

A Cross sectional research design, of which a time-dimensional design which is type of descriptive study design was used, which studies the occurrence and distribution of disease among population where sample were studied at a "point" in time. [12, 13]

Setting & sample of the study:

This study was planned to conduct in selected primary schools of urban areas in Tirupati, Andhra Pradesh, India. The population were school going children (7 to 11 years).

Sampling technique:

In this study multistage cluster sampling was used which is one of the random sampling techniques. Initially a list of total schools in Tirupati of all urban areas was taken from Educational Officer, Tirupati; among all areas, specific areas were selected randomly by using lottery method, then, specific schools of selected areas were selected again by using simple random sampling method; finally all the students who were studying 3rd, 4th and 5th standard in selected schools were included as sample for the study.

Data Collection Technique

The present study planned mainly to compute the prevalence of ADHD among school children. Hence the following tools were planned to use in the study:

- Demographic proforma
- SNAP – IV Teacher and Parent Rating Scale to assess ADHD

Development of demographic Proforma:

The first part of the tool consists of 21 questions to the parents to collect data regarding demographic proforma of the student. It mainly consists of items about gender, age, religion, type of family, school type, education of father, education of mother, occupation of father, occupation of mother, number of siblings, place of domicile, residence, income of family, order of birth, time spent by parent with their children including duration and type, place of birth, history of previous hospitalization due to attention deficit or hyperactivity, family history of Attention Deficit Hyperactivity Disorder. It also includes questions to the teachers regarding their educational qualification, years of teaching experience, duration of contact with the students, knowledge about Attention Deficit Hyperactive Disorder. To ensure the content validity, the tool along with criteria checklist was given to 10 experts constituting psychiatrists, psychologists and mental health nursing personnel. There was 100% agreement and acceptance for all items.

SNAP – IV Teacher and Parent Rating Scale to assess ADHD

The SNAP-IV Rating Scale is a revision of the James Swanson, Nolan and Pelham (SNAP) Questionnaire (Swanson et al, 1983). The items from the DSM-IV (1994) criteria for Attention-Deficit/Hyperactivity Disorder (ADHD) are included for the two subsets of symptoms: inattention (item #1 to #9) and hyperactivity/ impulsivity (item #10 to #18). [14]

Data Collection Process

To conduct the study in the schools a written permission was obtained from the Commissioner of Municipality, Tirupati, prior to the data collection period. The data collection period extended from 17th Feb 2011 to 21st Mar 2011. Confidentiality was assured to the school authorities and to all the parents and teachers of the study subjects to get their confidence and co-operation. Informed consent was taken from teachers and parents of study subjects and from the school authority.
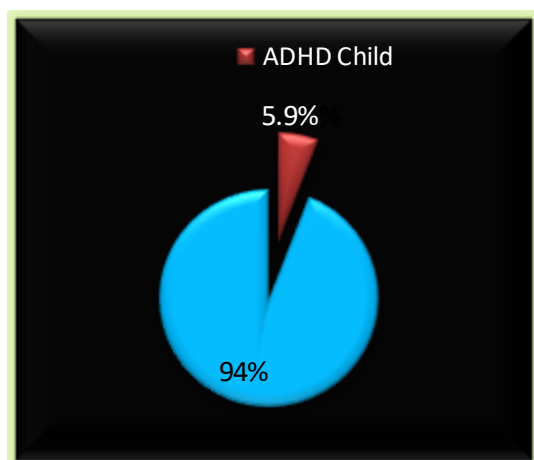
Initially 403 students were screened. It comprised of two steps. During the first step teachers meeting was conducted and explained the objectives of the study and importance of identifying mental health problems in the school age children and also explained about the items in the questionnaire and what it is intended to gather. Then SNAP-IV rating scale was administered to teachers of 3rd, 4th and 5th standards; data were computed to identify the students with features of ADHD. In the second step the parents of those students who met the criteria for diagnosis of ADHD were called for a meeting and explained about the study and its objectives. Then, SNAP IV ADHD rating scale was administered to parents.

Data Analysis

It was planned to analyze the data in terms of descriptive statistics (mean,

percentage, standard deviation) and inferential statistics (Paired 't' test and chi square test) on the basis of objectives of the study. Out of 403 children, 24 (5.9%) were found to have an above average score on SNAP-IV ADHD rating scale both by teacher's and parent's information.

Prevalence of ADHD: Among 403 samples, it was shown that 24 (5.9%) children identified as having features of ADHD either of inattention, hyperactivity or ADHD-combined type, remaining 379 (94%) were considered as normal children.

PREVALENCE OF SUB TYPES OF ADHD:

Distribution of subjects based on subtypes of ADHD has shown that among 24(5.9%) identified children, 22(5.45%) categorized as ADHD-combined type, 1(0.24%) child categorized as ADHD-inattention type and 1(0.24%) child categorized as ADHD-hyperactive type.
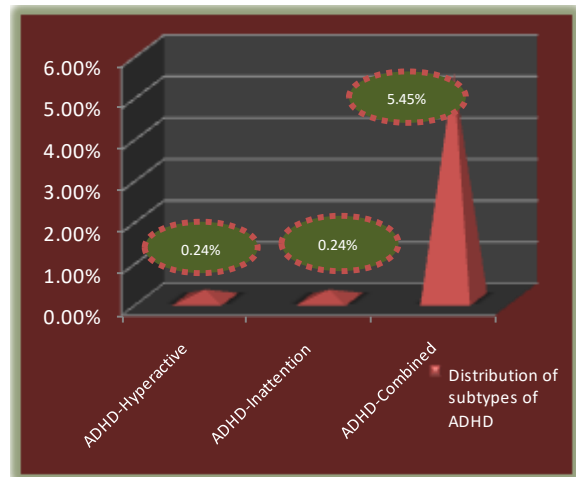
Percentage distribution of subtypes of ADHD

Percentage of distribution of ADHD among school children

Description of sample characteristics:

Table 1: Frequency and percentage distribution of demographic variables of subjects.   **N= 24**

S.NO	DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENTAGE (%)
1.	**Gender**		
	Female	15	62.5
	Male	9	37.5
2.	**Age**		
	7 years	1	4.2
	8 years	9	37.5
	9 years	10	41.7
	10 years	4	16.7
	11 years	0	00
3.	**Religion**		
	Hindu	17	70.8
	Christian	3	12.5
	Muslim	4	16.7
4.	**Type of family**		
	Nuclear family	15	62.5
	Joint family	9	37.5
5	**Type of School**		
	Government	9	37.5
	Private	15	62.5
6.	**Education of father**		
	Illiterate	4	16.7
	Primary school	6	25
	High school	3	12.5
	Higher secondary	4	16.7
	Graduate	4	16.7
	Post graduate	3	12.5
7.	**Education of mother**		
	Illiterate	10	41.7
	Primary school	2	8.3
	High school	6	25

	Table 1: To be continued…		
	Intermediate	4	16.7
	Graduate	2	8.3
8.	**Occupation of father**		
	Government employee	1	4.2
	Private employee	12	50
	Business	11	45.8
9.	**Occupation of the mother**		
	Government employee	2	8.4
	Private employee	1	4.2
	House wife	21	87.5
10.	**Number of siblings**		
	One	10	41.7
	Two	13	54.2
	Three	1	4.2
11.	**Place of domicile**		
	Staying with parents	24	100
12.	**Type of residence**		
	Urban	21	87.5
	Rural	3	12.5
13.	**Income of family**		
	2500 – 5000	5	20.9
	5001 – 10000	14	58.3
	10001 – 15000	1	4.2
	Above 15000	4	16.8
14.	**Order of birth**		
	First child	13	54.2
	Second child	10	41.7
	Third child	1	4.2
15.	**Time spent with child**		
	Yes	24	100
	Helping in studies		
	No	8	33.3
	Yes	16	66.7
	Participating in play activities with the child		
	No	15	62.5
	Yes	9	37.5
	Watching T.V along with the child		
	No	14	58.3
	Yes	10	41.7
	Reading / Telling stories to the child		
	No	19	79.2
	Yes	5	20.8
16.	**Number of hours spending with child**		
	< 1 hour	1	4.2
	1 hour	2	8.3
	2 hours	12	50
	3 Hours	7	29.2
	>3 hours	2	8.3
17.	**Place of delivery**		
	Institutional delivery	22	91.7
	Hospital delivery	2	8.3
18.	**Type of birth**		
	Normal delivery	19	79.2
	Caesarean section	5	20.8
19.	**History of eventful pregnancy**		
	Yes	4	16.7
	No	20	83.3
20.	**If yes, specify?**		
	Normal delivery	20	83.3
	Breech presentation	1	4.2
	Forceps delivery	2	8.3
	Premature birth	1	4.2
21.	**History of hospitalization due to ADHD**		
	Yes	0	00
	No	24	100
22.	**History of ADHD in family**		
	Yes	0	00
	No	24	100

Interpretation:
Gender: Among 24 school going children 15(62.5%) were girls and 9(37.5%) were boys which shows 2:1 male and female ratio

Age: Related to age 1(4.2%) student aged seven years, 9(37.5%) students aged about eight years, 10(41.7%) students aged about

nine years, 4(16.7%) students aged about 10years and there were no 11years students.
Religion: Sample of 17(70.8%) subjects were Hindus, 3(12.5%) subjects were Christians and 4(16.7%) subjects were Muslims
Type of Family: With regard to type of family, 15(62.5%) subjects belong to nuclear family and 9 (37.5%) subjects belong to joint family.
Type of School: Government school children were 9 (37.5%) subjects and 15 (62.5%) subjects were studying in private school
Education OF Father AND Mother: Among all, illiterate fathers were 4(16.7%), 6(25%) members studied up to primary education, 3(12.5%) members studied up to high school education, 4(16.7%) members studied up to higher secondary education, 4(16.7%) members did graduation and 3(12.5%) members studied post graduation Of all, illiterate mothers were 10(41.7%) members, 2(8.3%) members studied up to primary education, 6(25%) members studied up to high school education, 4(16.7%) members studied up to intermediate and 2(8.3%) members did graduation
Occupation of Father and Mother: With regard to occupation of the father 1(4.2%) member was government employee, 12(50%) members were private employees and 11(45.8%) members were business men. With regard to occupation of the mother 2(8.4%) members were government employees, 1(4.2%) member was private employee and rest 21(87.5%) members were house wives.
Family Income per Month: Income of the family shown that 5(20.9%) families earning around 2500-5000 /-, 14(58.3) families earning around 5001-10000/-, 1(4.2%) family earning around 10001-15000/- and 4(16.8%) families earning above 15000/- per month.
ORDER OF BIRTH: Related to order of birth 13(54.2%) subjects were first born children, 10(41.7%) subjects were second born children and 1(4.2%) child was third born child.

Way Of Spending Time With Children By Parents: All 24(100%) parents were spending time with children; among them 16(66.7%) members were helping child in studies, 9(62.5%) members were participating in play activities with the child, 10(41.7%) members were watching T.V along with the child and 5(20.8%) members were reading/telling stories to the child.
History of eventful pregnancy:
In view of history of eventful pregnancy, 20(83.3%) members delivered normally, 1(2.4%) child through breech presentation, 2(8.3%) children through forceps delivery and one child is premature
- Sample of 10(41.7%) subjects were having only one sibling, 13(54.2%) subjects were having two siblings and 1(4.2%) subject was having three siblings
- All the 24(100%) subjects were staying with parents
- With regard to type of residence 21(87.5%) subjects were living in urban areas and rest 3(12.5%) subjects were living in rural areas
- In relation to the number of hours spending with child 1(4.2%) family was spending less than one hour with the child, 2(8.3%) families were spending one hour with child, 12(50%) families were spending two hours with the child, seven (29.2%) families were spending three hours with the child, 2(8.3%) families were spending more than three hours with the child.
- With regard to type of delivery 19(79.2%) children delivered normally and 5(20.8%) children delivered by caesarean section
- All 24(100%) subjects had no history of hospitalization due to ADHD and there were no family history of ADHD

Table 2: Frequency and percentage distribution of teacher's information.   **N = 24**

S.NO	TEACHERS INFORMATION	Frequency	Percentage (%)
1.	**Teaching experience**		
	1 year	7	29.2
	2 years	8	33.3
	3 years	1	4.2
	6 years	3	12.5
	7 years	3	12.5
	21 years	2	8.3
2.	**Duration of contact with student**		
	5 months	7	29.2
	8 months	13	54.2
	9 months	3	12.5
	10 months	1	4.2
3.	**Awareness on ADHD**		
	No	22	91.7
	Yes	2	8.3
4.	**Designation of Teacher**		
	Senior grade teacher	9	37.5
	Teacher	15	62.5
5.	**Educational qualification of the teacher**		
	B.A., B. Ed	1	4.2
	B.Com., B. Ed	10	41.7
	B. Sc	8	33.3
	M.A., B. Ed	5	20.8

Interpretation:

Twelve teachers of selected schools in Tirupati have given information about students. Among them:

- With regard to the years of teaching experience, seven (29.2%) members had one year experience, eight (33.3%) members had two years experience, one (4.2%) teacher had three years of experience, three (12.5%) members had six and seven years of experience respectively and two (8.3%) teachers had 21 years of experience

- In relation to the duration of contact of teachers with students, seven (29.2%) students had five months of contact with teacher, 13 (54.2%) students had eight months contact, three (12.5%) students had nine months of contact and one (4.2%) student had ten months of contact with particular teacher.

- Regarding awareness of the teachers on ADHD, 22 (91.7%) teachers does not possess awareness and two (8.3%) members possess awareness regarding ADHD

- Designation of teachers shows that, nine (37.5%) members are senior grade teachers and 15 (62.5%) are junior teachers

- An account of educational qualification of teachers showed that one (4.2%) teacher's qualification was B.A., B. Ed, 10(41.7%) had B.Com., B. Ed qualification, eight (33.3%) had B. Sc qualification and five (20.8%) members possess M.A., B. Ed qualification.

Table 3: Association between ADHD with selected demographic variables.   N=24

S. No	Demographic variables	Frequency	Chi square	df	'p' value
1.	**Gender**				
	Female	8			0.527
	Male	16	0.320	1	@
2.	**Age**				
	7 years	1			
	8 years	9			
	9 years	10	2.88	2	0.237 @
	10 years	4			
	11 years	0			
3.	**Religion**				
	Hindu	17	6.171	1	0.013
	Christian	3			**
	Muslim	4			
4.	**Type of family**				
	Nuclear family	15			0.527
	Joint family	9	0.320	1	@
5	**Type of School**				
	Government	9			0.09
	Private	15	2.88	1	@
6.	**Education of father**				
	Illiterate	4			
	Primary school	6			
	High school	3	5.400	5	0.369
	Higher secondary	4			@
	Graduate	4			
	Post graduate	3			

	Table 3: To be continued…				
7.	**Education of mother**				
	Illiterate	10			
	Primary school	2			
	High school	6	3.48	4	0.481 @
	Intermediate	4			
	Graduate	2			
8.	**Occupation of father**				
	Government employee	1			
	Private employee	12	1.691	2	0.429 @
	Business	11			
9.	**Occupation of the mother**				
	Government employee	2			
	Private employee	1	0.686	2	0.71 @
	House wife	21			
10.	**Number of siblings**				
	One	10			
	Two	13			
	Three	1	0.905	2	0.636 @
	More than three	0			
11.	**Place of domicile**				
	Staying with parents	24			
12.	**Type of residence**				
	Urban	21			0.408
	Rural	3	0.68	1	@
13.	**Income of family**				
	2500 – 5000	5			
	5001 – 10000	14			
	10001 – 15000	1	9.6	11	0.567 @
	Above 15000	4			
14.	**Order of birth**				
	First child	13			
	Second child	10	0.905	2	0.636 @
	Third child	1			
15.	**Number of hours spending with child**				
	< 1 hour	1			
	1 hour	2			
	2 hours	12	1.629	4	0.804 @
	3 Hours	7			
	>3 hours	2			
16.	**Place of birth**				
	Hospital delivery	22			0.509
	Home delivery	2	0.436	1	@
19.	**H/O eventful pregnancy**				
	Yes	4			0.05
	No	20	3.84	1	**
16.	**Type of birth**				
	Normal delivery	19			0.822
	Caesarean section	5	0.051	1	@
17.	**H/O eventful pregnancy**				
	Normal delivery	20			0.126 @
	Breech presentation	1			
	Forceps delivery	2	8.6	5	
	Premature birth	1			
18.	**H/O hospitalization due to ADHD**				
	Yes	0			0.648
	No	24	0.209	1	@
19.	**H/O ADHD in family**				
	Yes	0	0.209	1	0.648
	No	24			@

Note: @: not significant **: significant

It depicts that there is a significant association at 0.05 level of significance between ADHD and demographic variables like religion and history of eventful pregnancy of study population.

Table 4: Association between ADHD with selected demographic variables of Teachers.

S. No	Teacher's Information	Frequency	Chi square	Df	'p' value
1.	**Teaching experience**				
	1 year	7			
	2 years	8			
	3 years	1	4.629	5	0.463
	6 years	3			@
	7 years	3			
	21 years	2			
2.	**Duration of contact with student**				
	5 months	7			
	8 months	13	0.844		
	9 months	3		3	0.839
	10 months	1			@
3.	**Awareness on ADHD**				
	No	22	0.458		0.498
	Yes	2		1	@
4.	**Designation of Teacher**				
	Senior grade teacher	9			0.572
	Teacher	15	0.32	1	@
5.	**Educational qualification of the teacher**				
	B.A., B. Ed	1			
	B.Com., B. Ed	10	3.84		
	B. Sc	8		3	0.279
	M.A., B. Ed	5			@

Note: @: not significant

It showed that there is no significant association between ADHD and selected demographic information of teachers.

RESULT

Findings of the present study shows that among 403 school going children (7 to 11 years), 24 (5.9%) identified as having features of ADHD, among them, 22 (5.45%) categorized as ADHD-combined type, one child (0.24%) categorized as ADHD-inattention type and one child (0.24%) categorized as ADHD-hyperactive type which shows ADHD- combined type is more predominant than other sub types of ADHD.

It found that among 24 children 15(62.5%) were boys and 9(37.5%) were girls which shows ADHD is more prevalent in boys than girls.

Findings also revealed that there is a significant association between prevalence of ADHD and selected demographic variables such as type of residence, type of school, history of eventful pregnancy and religion of study population and there is no significant association with teachers' demographic variables.

DISCUSSION

It was found that ADHD is prevalent at a rate of 5.9% among school children of 7 to 11 years which is similar to the findings of a systematic review study on epidemiology of ADHD which found that the total prevalence of ADHD ranged between 1.3-16%. [15]

A study to estimate the world wide prevalence of ADHD with a purpose to determine the possible causes of the varied worldwide estimates of the ADHD and to compute the world wide pooled prevalence reported that ADHD was 5.29% which is supporting the current study findings. [2]

Findings also revealed that there is a significant association between prevalence of ADHD and selected demographic variables such as type of residence, type of school, history of eventful pregnancy and religion of study population which correlates with a study in South India on prevalence of SLD in schools found out to be 6.6% and there was a significant association with prematurity, cesarean section, delayed speech and family history of SLD. Among co-morbidities of SLD, association with ADHD alone has been found to be significant. [16]

It was also found that among 24 children, 15(62.5%) were boys and 9(37.5%) were girls which shows ADHD is more prevalent in boys than girls which is similar to that of an abstract on

identification of ADHD in children to show the prevalence of disorder in the age group of 5-12 years who found the male to female ration was 6.4:1. [17]

CONCLUSION

This study revealed that ADHD is prevalent at a rate of 5.9% among school children of 7 to 11 years; it is more prevalent in boys than girls. Findings also revealed that there is a significant association between prevalence of ADHD and selected demographic variables of study population.

Recommendations:

As findings of the study confirm the existence of ADHD among school children (7 to 11 years) which is correlated to the existing statistics, a study can be planned to identify the causes, co morbidities and psychiatric symptoms associated with ADHD. Similar study can be extended to identify the impact of ADHD on various life issues like family pattern, social relations of family, school performance etc and study can also be conducted as a cross sectional study to know the persistence of ADHD in adulthood from childhood ADHD.

Screening programs need to be conducted at schools for early detection and prompt treatment. Teaching programs will be effective in improving knowledge and attitude among primary school teachers regarding ADHD. Education programs should be established to increase awareness about ADHD among primary school teachers and parents. Mental interventions in handling a child with ADHD have to be taught both to the parents and teachers.

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