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PREVALENCE OF PSYCHIATRIC CO MORBIDITIES IN CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER AND ITS ASSOCIATION WITH SOCIO DEMOGRAPHIC VARIABLES- A CROSS SECTIONAL STUDY

Psychiatry

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ABSTRACT

Introduction: Neuropsychiatric problems are now becoming the leading cause of disability in almost all the age groups in developed as well as developing countries. Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorder affecting children. This condition even continues to persist in adulthood also.This makes high impact in academic performance and social living relationships. **Methodology:** This is a cross sectional study done among children and adolescents with the diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD). Participants were selected by consecutive sampling method with the sample size of 100. **Results:** Majority of the study participants were from school age group and from rural background. The mean age was 10. More than one fifth of the study participants were born of consanguineous marriage. Around 75 % of the participants had family history of psychiatric illness in them in their first degree relatives and 36% had family history of ADHD.Occupational defiant disorder was predominantly found in around 33% of the study participants. **Conclusion:** Attention-Deficit/Hyperactivity Disorder (ADHD) has multiple psychiatric comorbities which hampers and the academic performance and their social wellbeing. Hence by early detection & intervention morbidity of ADHD and its complications and other comorbidities can be reduced.

KEYWORDS

Psychiatry, ADHD, Comorbidity, Family, Poverty

INTRODUCTION:

Children are the world 's most valuable resource and its best hope for the future. Worldwide 10-20% of children and adolescents experience mental disorders. On analyzing the data from various parts of the world it was identified that leading cause of disability among the younger population were neuropsychiatric problems.. [1]One of the most prevalent neurodevelopmental conditions affecting children is Attention-Deficit/Hyperactivity Disorder (ADHD) with a prevalence of about 5% in most cultures. [2] For over 50% of those who have ADHD in childhood, these impairments persist into adulthood. Because of the chronic and pervasive nature of this condition, it has impact in school [3], workplace and relationships.[4] The key concept underlying the diagnoses of ADHD is that of maladaptive high levels of inattention, over activity, and impulsiveness problems.[5] It is known that ADHD afflicts not only young boys who are hyperactive but also a much wider segment of the population.

ADHD is further complicated by co-morbidities.Review of the available literature convey that nearly half (50%) of individuals with ADHD meet diagnostic criterias of other psychiatric problems in addition.. Co-morbid disorders may mask or be masked by symptoms of ADHD and thereby confuse the diagnostic process. Co-morbidities, recognized or unrecognized, may also seriously complicate the progress of treatment for ADHD. Those who assess, treat, educate, and care for children, adolescents, or adults with ADHD need to appreciate and understand the complexity of these disorders and their co-morbidities including psychiatric co-morbidities.[6]

In India, with 40% of the population being children [7], there is paucity in literature on psychiatric comorbidity of ADHD. [8] Hence this study will be an attempt to bridge the gap in the knowledge. This will help in the identification, assessment, early intervention and prevention of ADHD and its psychiatric co-morbidities.

OBJECTIVES:

The key objectives of this study are to assess the prevalence rates of various psychiatric co-morbidities in ADHD and to study the relationship between psychiatric co-morbidities with certain socio-demographic variables.

METHODOLOGY:

Study design: This is a descriptive cross sectional study

Study area: This study was carried out in a tertiary care hospital in Bangalore.

Study population: Children and adolescents aged between 3- 17 years with the diagnosis of ADHD

Sample size: Sample size was calculated based on DSM-5 manual in which the prevalence of ADHD was reported as 7% [2].At 95% confidence interval with 6% as absolute precision and 10% allowable error the sample size was calculated to be 79 and finally rounded off to 100 based on the formula $S=4PQ/L^2$.

Sampling method: Patients who presented with symptoms and met DSM-5 criteria for ADHD were selected using Consecutive sampling method (Simple random sampling method).

Study period: This study was conducted for a period of 18 months from January 2017 to June 2018.

Data Collection And Analysis:

Data was collected from 100 study participants using a structured pretested questionnaire, which had socio-demographic variables and MINI INTERNATIONAL NEUROPSYCHIATRIC INTERVIEW FOR CHILDREN AND ADOLESCENT 5.0 (MINI-KID) to assess the Psychiatric co morbidities in the study population. The data was collected after obtaining permission from Institute Ethics Committee. Data was tabulated and coded. SPSS version 22 was used for performing the statistical analysis. The Chi Square test and Fischer's exact test was used to assess the association between demographic and other important study variables. P value less than 0.05 is considered as significant.

RESULTS:

The mean age of the study participants was 10 years most of them were in the school age group. More than $4/5^{th}$ of the study participants were males and were from rural background. About $3/4^{th}$ of them were from nuclear family. Majority of the study participants (87%) had no history of substance abuse in their life time (Table 1). More than one fifth of the study participants were born of consanguineous marriage. About $3/4^{th}$ of the participants had family history of psychiatric illness in them in their first degree relatives and one third had family history of ADHD (Table 2).

Table 1: Sociodemographic Characteristics Of The Study Population.

S/No	Characteristics	Frequency(N=100)	Percentage
1	Age Group		
	Preschool (Less than 6)	9	9

	School age (6-11)	81	81
	Adolescent (12-17)	10	10
2	Gender		
	Male	88	88
	Female	12	12
3	Type of Family		
	Nuclear	78	78
	Joint	22	22
4	Place of Residence		
	Urban	14	14
	Rural	86	86
5	Socio-economic status (Modified KuppusamyScale)		
	Upper class	2	2
	Upper middle class	6	6
	Lower middle class	35	35
	Upper lower class	49	49
	Lower class	8	8
6	Substance abuse		
	Yes	13	13
	No	87	87

Table 2: Maternal And Family Risk Factors In Study Population

S/No	Characteristics	Frequency(N=100)	Percentage
1	Consanguineous Marriage		
	Yes	23	23
	No	77	77
2	History of Substance use in mother		
	Yes	3	3
	No	97	97
3	Birth weight		
	Very/Low birth weight	25	25
	Normal	75	75
4	Family history of Psychiatric illness		
	Yes	75	75
	No	25	25
5	Family history of ADHD		
	Yes	36	36
	No	64	64

About 2/3rd of study participants had combined type of ADHD (66) and more than 40% mild form. Various psychiatric co-morbidities were found in our study participants of which Occupational defiant disorder was predominantly found in around 33% of the study participants and only 15% showed no psychiatric co-morbidities (Table 3).

Table 3: ADHD In Study Population

S/No	Characteristics	Frequency(N=100)	Percentage
1	Presentation of ADHD		
	ADHD predominately Inattentive	25	25
	ADHD predominately Hyperactive	9	9
	ADHD Combined	66	66
2	Severity of ADHD		
	Mild	44	44
	Moderate	45	45
	Severe	11	11
3	Comorbid Psychiatric illness		
	Major depression	7	7
	Dysthymia	2	2
	Agoraphobia	1	1
	Separation anxiety disorder	3	3
	Conduct disorder	4	4
	ODD	33	33
	ODD & Enuresis	8	8
	ODD & Specific phobia	4	4
	ODD & Tic disorder	2	2
	PDD	7	7
	PDD, Enuresis	2	2
	PDD, ODD	1	1
	IDD	8	8
	IDD & Enuresis	3	3
	Nil	15	15

Combined type ADHD was found to be more prevalent among the school age group and male population and this association was found to be statistically significant (Table 4). Study participants from nuclear family were at 1.75 times higher risk of developing DBD when compared with participants from Joint family and this association is not statistically significant. Similarly, Poverty seems to be key factor for developing DBD with risk of 6 times than other psychosocial adversities and this association between Psychosocial adversity and DBD was found to be statistically significant(Table 5).

Table 4: Association Of ADHD With Sociodemographic Variables

Sl. no	Variables	ADHD			Chi-Square value	P value
		Inattentive	Hyperactive	Combined		
1	Age					
	School (less than 11)	15	9	66	33.33	0.000*
	Adolescent	10	-	-		
2	Gender					
	Male	17	8	63	12.94	0.002*
	Female	8	1	3		

(*p value < 0.05 is significant at 95% CI)

Table 5: Association Of Psychiatric Comorbidity And Socio-demographic Variables

Sl. no	Variables	DBD		Odds ratio	Chi-Square value	P value
		Yes	No			
1	Family					
	Nuclear family	31	47	1.759	0.672	0.3272
	Joint family	6	16			
2	Psychosocial adversity					
	Poverty	14	8	6.146	9.145	0.006*
	Conflict/ Mal treatment	6	22			

(*p value < 0.05 is significant at 95% CI)

DISCUSSION:

Majority of the study population was in the school age group 6-11 years with mean age of the sample being 10.4 years. This is in agreement to various epidemiological and clinical studies.[9-21]The finding could be explained by the fact that, school aged children display classical ADHD symptomatology of inattention and/or hyperactivity/impulsivity. However,difficulties exist in identifying a child with ADHD in pre-school age group because of its heterogeneous presentation.

This study consisted of 100 subjects, with a male preponderance (88%). Males are generally more likely to be diagnosed with ADHD than females, both in clinical and epidemiological samples the condition is much more common in males- 9 to 1 in clinical samples, 4 to 1 in epidemiological samples.[22] This was in contrary to the finding from a large European ADORE (Attention deficit hyperactivity disorder observational research in Europe) study of clinically referred children (n=1478; mean age: girls=8.8 years, boys=9.0 years) which found no evidence to suggest that core ADHD symptomatology differed between genders.[23]

Majority of the study population belonged to UPPER LOWER category of SES (n=49) according to Modified Kuppuswamy's classification system 2016. However, few recent studies have correlated low socio economic status with ADHD.[24-26] Low SES can be considered as environmental exposure or a series of environmental exposures like adverse childhood events that might influence gene expression by changes in DNA methylation.[27]

Our study found out that family history of ADHD was seen among 1/3rd of the study respondents. It has been well established that ADHD has a strong genetic component by various twin and adoption studies which shows a heritability of 71 to 90%.[28] Our finding is similar to a study done in Brazil by Bauermeister and colleagues [18] where 35% of the subjects had history of Hyperactivity and Inattention in parents during their childhood.

Two third of study participants had combined ADHD as the most common presentation. This is similar to findings in our literature.[11-

[16]This was in contrary to many communities based studies that had reported inattentive ADHD as the most common presentation. This might be explained by the fact that the diagnosis of ADHD combined in a clinical setting is attributed to referral bias because combined presentations with externalizing symptoms and/ or disruptive behaviors tend to attract the parents attention more than inattentive symptoms with internalizing symptoms. In this study, forty-five subjects had moderate severity of ADHD, forty-four had mild and thirteen had severe type of ADHD. This finding is similar to the literature available [9-21].

According to DSM-5, Severity of ADHD is based on the number of symptoms and functional impairment caused by the symptoms. Family history of ADHD, Birth Injury, Psychosocial adversities can worsen the concurrent ADHD illness and it severity. Due to delay in identifying the symptoms of ADHD early because of lack of awareness, Low SES, familial dysfunction many present to the tertiary center with slightly aggravated symptoms of ADHD. Hence early detection can go a long away in reducing the severity of ADHD.

DBD (n=52) was the most common psychiatric comorbidity in this study with Forty-Eight subjects were found to have ODD and Four subjects had Conduct disorder. This is in agreement with several studies done in a tertiary care setting. Ficks and Waldman [29]performed a metaanalysis in which antisocial behaviour and ADHD were significantly associated with SLC64A polymorphism and dopamine genes respectively. Parental insensitivity along with DRD4 plays an important role in the development of conduct and oppositional disorders. Hence there is a high prevalence of DBD in ADHD. Among the presentations of ADHD, the prevalence of ODD/CD appears greater in patients with the combined ADHD subtype than in those with the inattentive subtype.[30, 31]Usuallychildren with ADHD/ hyperactivity are deficient in sustained attention and disinhibition components of attention, on the contrarychildren with ADHD without hyperactivity have deficits in the focused component of attention or that involving cognitive processing speed. Notably, executive dysfunction and difficulties with impulsivity and response inhibition are observed more in patients with the d subtype than the other subtypes[30].

CONCLUSION

ADHD had a significant number of psychiatric co-morbidities and their evaluation is crucial for adequate management. Moreover, the more the severe the ADHD the chances of having psychiatric co-morbidities are greater. Hence by early detection & intervention morbidity of ADHD can be reduced.

LIMITATIONS

- Sample size of the study was small
- The study population was hospital based not representative of the community
- The study was cross sectional with no follow up
- The study did not have a control group for comparison.

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