

Prevalence of Major Depressive Disorder among Mothers of Children and Adolescents with Attention Deficit Hyperactivity Disorder Attending a Tertiary Care Centre

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Introduction: Attention deficit hyperactivity disorder (ADHD) accounts for the majority of referrals to child and adolescent psychiatry services because of the associated poor scholastic performance. Despite the possibility of depressive symptoms in caregivers, there is a paucity of studies on major depressive disorder among mothers of children and adolescents with ADHD in our setting.

Objectives: Assessing the prevalence of major depressive disorder and the association of sociodemographic and clinical variables among mothers of children & adolescents with ADHD attending a tertiary care centre. Studying the correlation between the severity of ADHD and maternal depression. **Methods:** Cross-sectional study on 150 mothers of children and adolescents aged 5-18 years with ADHD attending the Child and Adolescent Psychiatry Clinic of the Govt. Medical College, Thiruvananthapuram. **Results:** The prevalence of Major Depressive Disorder among mothers belonging to the age group of 30–39 years was found to be 20%. Across age groups, 28.7% of the subjects had minimal depressive symptoms, while 10% each had mild and moderate symptoms. We found a positive correlation between the severity of maternal depression and the child's ADHD. The association of major depressive disorder with medical comorbidities and having another offspring with ADHD was statistically significant. **Conclusion:** Owing to the statistically high prevalence of depressive disorders, routine screening for depressive symptoms has to be considered for mothers when their children are diagnosed with ADHD, with the provision for appropriate intervention.

Keywords: Attention Deficit Hyperactivity Disorder, Major Depressive Disorder

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that has received considerable research attention [1]. According to DSM-5, ADHD is defined by a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development [2]. Prevalence of ADHD is highest in elementary school-age children, particularly boys [3], and usually presents with several comorbidities, some of which may become severe [4,5] if interventions are not made [6].

Parents of children with moderate to severe ADHD are prone to considerable psychological stress and often reach a stage of learned helplessness [7]. Studies have shown that depression, anxiety and parenting stress are more in mothers of children with ADHD [8,9,10]. The symptom and prevalence of depressive disorders are well documented [11] and women (5.1%) are affected more commonly than men (3.6%) with a peak in the 55–74 years age group in both sexes. India is home to an estimated 57 million people (18% of the global estimate) affected by depression [12]. More than 80% of these had not received any treatment, with a treatment gap of 87.2–95.7% that can be attributed to social stigma as well as the lack of competence of primary healthcare professionals in detecting, diagnosing, or managing depression [13–17].

Taking into consideration the public health importance of effective intervention for major depressive disorder, the focus must be on the identification and treatment at the primary health care level as well as on removing the stigma associated with mental illness. Intersectoral collaboration and action are required to address the burden and impact of depression. Even though several studies regarding the prevalence of depressive disorders in mothers of ADHD children, as well as various aspects of their quality of life have been conducted abroad [8–10, 18–20, 24–29, 31–33], there is a paucity of literature specific to the Indian context. Available literature tends to focus on the correlation between ADHD variants and parental response rather than on the interplay of sociocultural factors [30]. However, considering the unique sociocultural factors at play in India, more particularly in Kerala, is critical to devising effective strategies for intervention.

Materials and Methods

Study Design: Cross-sectional study.

Study Setting: Child & Adolescent Psychiatry Clinic, Govt. Medical College, Thiruvananthapuram, which is a tertiary care centre.

Study Population: Mothers of children and adolescents diagnosed to have ADHD by a qualified Psychiatrist according to DSM 5 criteria and attending the Child and Adolescent Psychiatry Clinic in a tertiary care centre.

Study Period: 1.5 years.

Inclusion Criteria:

1. Mothers of children and adolescents aged 5-18 years who are diagnosed to have ADHD by a qualified Psychiatrist according to DSM 5 criteria.
2. Willingness to participate documented through written informed consent.

Exclusion Criteria:

1. Mothers of children and adolescents with comorbid Intellectual Disability, Autism Spectrum Disorder, diagnosed by a qualified Psychiatrist, according to DSM 5 criteria.
2. Those who cannot cooperate with the interview.

Sample Size : According to a cross-sectional study conducted on 100 mothers of school-aged children with ADHD, the prevalence of depression was found to be 40% [8]. The sample size was calculated as

$$N = Z\alpha^2 pq/d^2$$

Where $Z\alpha^2=4$, $p = 40\%$, $q = 100 - p = 100 - 40 = 60$, $d = 20\%$ of $p = 8$ and $N=4 \times 40 \times 60 / 64 = 150$

Sampling Technique: Consecutive cases satisfying the inclusion criteria attending the Child & Adolescent Psychiatry Clinic, Govt. Medical College, Thiruvananthapuram till the sample size was achieved was selected for the study.

Tools:

1. Proforma for sociodemographic data and other study variables
2. Patient Health Questionnaire (PHQ) 9 for Depression [37]
3. Attention Deficit Hyperactivity Disorder Rating Scale-IV- Home version [38–40]

Variables Studied:

1. Sociodemographic variables: age, religion, educational status, occupational status, socioeconomic status: above poverty line (APL) or below poverty line (BPL) as per the norm of the government of Kerala, marital status, no. of children, family size, family type.

2. Other clinical variables: substance use in a spouse - as reported by the mother, coexisting ODD, CD, LD, substance use disorder and other comorbidities in the child, diagnosed by a qualified psychiatrist according to DSM-5 criteria, other offspring/s with ADHD - symptoms of ADHD in other offspring as reported by the mother, history of mental illness as reported by the mother, history of major depressive disorder as reported by the mother, family history of mental illness as reported by the mother. history of medical comorbidities: diabetes mellitus, systemic hypertension, hypothyroidism, bronchial asthma and heart disease as reported by the mother.

Data Analysis: The data collected was entered into a Microsoft Excel sheet. Analysis was done using SPSS version 16. Descriptive statistics were provided. Univariate analysis was done. A chi-square test was done to assess significance. The odds ratio and confidence intervals were calculated to determine the strength of the association. The correlation was assessed using Pearson's correlation coefficient. $p < 0.05$ was considered statistically significant.

Ethics: Institutional ethics committee clearance was obtained before the study. Written informed consent was obtained from all the study subjects. Confidentiality was ensured and maintained throughout the study. No cost was incurred on the part of the study subjects. The study subjects found to have Major Depressive Disorder were educated and offered treatment.

Results

From the collected data, the majority of the children (46%) belonged to the age group of 10–14 years. The mean age of the children and adolescents was 10.99 years with a standard deviation of 3.450 years. The median age was 11 years. Summarizing the age-wise gender composition indicates that there was no significant difference between the mean ages of boys and girls.

The majority of the children seeking treatment in the clinic were boys (87.3%). Hyperactive-impulsive type of ADHD is more common in boys and typically, more boys are referred to the clinic. As an inattentive type of ADHD is more common in girls, it may be missed. Even if identified, social stigma may prevent the parents from bringing a girl child to a medical facility. The duration of treatment for ADHD at the Child and Adolescent Psychiatry Clinic, Govt. Medical College, Thiruvananthapuram was less than 1 year for the majority (68.7%) of the children. The number of days of follow-up ranged from 1 day to 3650 days. The mean days of follow-up were 353.22 days with a standard deviation of 651.151 days. The median was 30 days. The distribution of the number of days of follow-up is positively skewed and there were several outliers.

Summarized data on the mothers' ages indicate that the majority of the mothers belonged to the age group of 30–39 years (58.7%). The mean age of the mothers was 36.41 years with a standard deviation of 5.464 years. The median was 36 years. Majority of the mothers identified as belonging to the Hindu religion (64.7%). According to the 2011 Census of India [41] figures, 54.73% of Kerala's residents are Hindus, 26.56% Muslims and 18.38% Christians. More than one-third of the mothers were graduates and above (37.3%). An overwhelming majority of the mothers were unemployed (68.7%). Even though most of the mothers are educated, being the primary caregiver for their child with ADHD has affected their employment prospects.

As regards socioeconomic status, 52.7% of the mothers belonged to the Below Poverty Line (BPL) category and 86% of the mothers were married. Also, 60.7% of the mothers had two offspring and slightly more than half of those surveyed belonged to nuclear families. Also, nearly half of the participants reported substance abuse by the spouse, with 44% of the spouses falling into this category. Alcohol use was reported in 16% and tobacco use in 6.7%, while 21.3% consumed both.

Among those surveyed, 55.3% of children and adolescents had comorbidities associated with ADHD. Among the comorbidities, the most common was ODD (20.7%), followed by suspected LD (10%). Also, 7.3% had associated CD, 1.3% had substance use disorder and 7.2% had a combination of these comorbidities; 8.7% of the children and adolescents with ADHD

Had other comorbidities like obsessive-compulsive disorder, social anxiety disorder, tic disorder, and seizure disorder. The summarized data also show that 9.3% of the mothers had other offspring with ADHD. Only 7.3% of the mothers had a history of mental illness, among whom 6% had a history of major depressive disorder. However, 18% of the mothers reported having a family history of mental illness.

The prevalence of medical comorbidities and major depressive disorder have also been studied with 35.3% of mothers reporting medical comorbidities. The most prevalent was hypothyroidism (16%) followed by diabetes mellitus (5.3%), systemic hypertension (4.7%), and bronchial asthma (3.3%). Approximately 6% of the mothers had multiple comorbidities. The prevalence of major depressive disorder among the mothers of children and adolescents with ADHD was found to be 20%.

From the PHQ-9 scores in Table 1, 28.7% of the mothers had minimal depressive symptoms (score 5-9), 10% had mild (score 10-14) and 10% of the subjects had moderate (score 15-19) major depressive disorder. The different symptoms and manifestations of major depressive disorder were also reported; the most reported symptoms were low mood (70.7%), fatigue (58.7%), anhedonia (41.3%), inattention (38%) and sleep impairment (33.3%). Death wishes were reported by 24% and functional impairment by 15.3% of the mothers. As indicated in Table 2, a positive correlation was found between the severity of ADHD in the child and the presence of major depressive disorder in the mother (Pearson correlation coefficient, $r=0.271$, $p=0.01$).

Table 1: Table showing the distribution of the PHQ-9 score.

PHQ9 score(range)	Frequency	Percent
<5	77	51.3
5 to 9	43	28.7
10 to 14	15	10.0
15 to 19	15	10.0
Total	150	100.0

Table 2: Statistical parameters of ADHD RS-IV score

	ADHD RS - IV Score
Mean	30.89
Median	31.00
Std. Deviation	12.085
Maximum	54
Minimum	6

Univariate analyses were conducted for the association of major depressive disorder with sociodemographic and clinical variables. From this analysis, the age and gender of the child with ADHD were not found to be a risk factor for major depressive disorder in the mother. There was an increased risk for major depressive disorder in the mother when the duration of treatment for ADHD was less than 1 year. The risk was less if the mother was below 40 years of age. The risk for major depressive disorder was slightly less if she belonged to the Hindu religion. On the one hand, mothers who were graduates or above showed a slightly increased risk for major depressive disorder. Occupational status or marital status, on the other hand, was not found to be a risk factor. There was a lower risk for major depressive disorder if the mother belonged to the APL category. The risk for major depressive disorder was less if the mother had only a single child. Also, being in a nuclear family presented a slightly increased risk for major depressive disorder in the mother. However, all these associations were not statistically significant. Notably, the presence of comorbidities along with ADHD was not found to be a risk factor for major depressive disorder in the mother.

Table 3: Association between Major Depressive Disorder and substance use in spouse

Substance use in spouse	Major Depressive Disorder				Total		OR = 1.895 95%CI = 0.844 - 4.254
	Present		Absent		N	%	
	N	%	N	%			
Present	17	25.76	49	74.24	66	100	
Absent	13	15.48	71	84.52	84	100	
Total	30	20	120	80	150	100	

$X^2 = 2.442$, $p = 0.118$

The risk for major depressive disorder in the mother was elevated if the spouse had substance use. There was an increased risk for major depressive disorder in the mother, if she had another offspring with ADHD and the association was statistically significant ($p = 0.025$). The mother had an increased risk for major depressive disorder, although statistically insignificant if there was a history of mental illness or depressive disorders. Having a medical comorbidity had an increased risk for the development of major depressive disorder in the mother and the association was statistically significant ($p = 0.008$). The data corresponding to these significant correlations are tabulated in Tables 3,4 and 5

Table 4: Association between Major Depressive Disorder and the presence of other offspring/s with ADHD.

offspring with ADHD	Major Depressive Disorder				Total		OR = 3.500 95%CI = 1.112 – 11.017
	Present		Absent		N	%	
	N	%	N	%			N
Present	6	42.86	8	57.14	14	100	
Absent	24	17.65	112	82.35	136	100	
Total	30	20	120	80	150	100	

$X^2 = 5.042, p = 0.025$

Table 5: Association between Major Depressive Disorder and the medical comorbidities in the mother.

Medical comorbidities	Major Depressive Disorder				Total		OR = 2.933 95%CI = 1.293 – 6.657
	Present		Absent		N	%	
	N	%	N	%			N
Present	17	31.48	37	68.52	54	100	
Absent	13	13.54	83	86.46	96	100	
Total	30	20	120	80	150	100	

$X^2 = 6.952, p = 0.008$

Discussion

The primary objective of this study was to estimate the prevalence of Major Depressive Disorder among the mothers of children and adolescents with ADHD attending the Child and Adolescent Psychiatry Clinic, Govt. Medical College, Thiruvananthapuram. 150 mothers satisfying the inclusion criteria were selected for the study. After getting the written informed consent, they were assessed with the relevant questionnaires and the data was analyzed.

According to the Gender Statistics 2014 – 2015 published by the Dept. of Economics and Statistics, Govt. of Kerala in 2016, the educational scenario in Kerala is in a better position than the rest of the country. The female literacy rate in the state is 92%. Above 75% of enrolment at the graduate and the postgraduate level are from girls. But, in Kerala, unemployment is found to be much higher among women than men. A large proportion of women, especially in rural areas are engaged in domestic duties. Women, even when they are gainfully employed, tend to concentrate on jobs which do not require high levels of educational qualifications and technical skills and which yielded low earnings. This is especially true among educated females both in urban and rural areas. In this study, it was found that the majority of the mothers are unemployed

(68.7%). Even though most of the mothers are educated, taking care of their child with ADHD prevents them from going for jobs.

In the present study, it was found that 37.3% of the fathers used alcohol. Considering the genetics of ADHD and as substance use is commonly seen with ADHD, there is a possibility of ADHD in the fathers and the children are at a higher risk for developing substance use in them.

In this study, the prevalence of major depressive disorder among mothers was found to be 20%. Other studies [8,9,10,18,19] reported a prevalence ranging from 20–80%. The wide variation in the reported prevalence rates could be due to the differences in the study design, study setting, study population, sample size, sociodemographic factors, data collection tools, and techniques used. These studies have been conducted outside India, and cultural differences may be present. Moreover, they have used the BDI, HADS, and Zung self-rating depression scale for detecting major depressive disorder. Sample sizes used in the studies were also small.

The study found a positive correlation between the severity of the major depressive disorder in the mother and the severity of ADHD in the child (Pearson correlation coefficient $r = 0.271, p = 0.01$).

The sociodemographic and clinical variables found to be associated with increased risk for major depressive disorder in the mothers were duration of treatment for ADHD of less than 1 year, mothers who were graduates and above, being in a nuclear family, substance use in the spouse, having another child with ADHD, history of mental illness, history of major depressive disorder and the presence of medical comorbidities. But only the association of major depressive disorder with the presence of medical comorbidities ($p = 0.008, 95\% \text{ CI } 1.293\text{--}6.657$) and having another offspring with ADHD ($p = 0.025, 95\% \text{ CI } 1.112\text{--}11.017$) was statistically significant.

The sociodemographic and clinical variables found to be associated with a lower risk for major depressive disorder in the mothers were the age of the mother being less than 40 years, being Hindu, belonging to the APL category, having a single offspring, and having a family history of mental illness.

Conclusion

The prevalence of Major Depressive Disorder in mothers of children and adolescents with ADHD was found to be 20% after assessing 150 mothers.

A positive association was found between Major Depressive Disorder and having another offspring with ADHD ($p= 0.025$, 95% CI 1.112–11.017) and the presence of medical comorbidities ($p= 0.008$, 95%CI 1.293–6.657).

A positive correlation was obtained between the severity of ADHD in the child & Major Depressive Disorder in the mother ($r = 0.271$, $p = 0.01$).

Limitations

1. As the design of the study is cross-sectional, the cause effects relation cannot be analyzed.
2. Results from a tertiary care centre sample cannot be generalized to the population at large.
3. Level of stress and anxiety symptoms in the mothers not studied.
4. As the sample size was small. A statistically significant association was not obtained between Major Depressive Disorder and several study variables even though the p value was approaching significance.

Recommendations

1. Routine screening for the depressive symptoms in mothers to be considered when the children are diagnosed with ADHD.
2. Appropriate intervention to be given to the mothers who are diagnosed to have Major Depressive Disorder.
3. Ensure the involvement of fathers in the management of the child with ADHD and its associated comorbidities.
4. Psychoeducation of the parents regarding the nature, course and prognosis of the illness in the child and the need for treatment should be practised regularly by the postgraduate trainees.
5. Parent Management Training (PMT) and Behavioural Therapy techniques to be taught to the parents.

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