

## ORIGINAL RESEARCH ARTICLE

# A COMPARATIVE ANALYSIS OF DETERMINANTS OF FAMILY DYNAMICS OF CHILDREN WITH ADHD WITH AND WITHOUT COMORBID CONDUCT DISORDER

### ABSTRACT

**BACKGROUND:** Comorbidity of attention-deficit/hyperactivity disorder (ADHD) is one of the most actively studied topics in the field of child and adolescent psychiatry. Among clinic-referred children, comorbidity is frequently found between ADHD and conduct disorder (CD). However, little is known regarding the probable association between the co-occurrence and external factors. One factor that has recently sparked interest is family dynamics.

**OBJECTIVE:** To compare the children with attention deficit/ hyperactivity disorder (ADHD) with and without co-morbid conduct disorder (CD) in terms of selected determinants of family dynamics and the influences of catchment area and gender on these differences.

**METHODOLOGY:** This case-control study was conducted upon a sample of 114 pre-diagnosed ADHD children from July 2017 to June 2019 at the Liaquat University Hospital & Sir CJIP. After taking written informed consent from parents of children diagnosed with ADHD, the children were re-evaluated using the Diagnostic & Statistical Manual (DSM) - V criteria. Vanderbilt Parent Rating Scale was also used to screen for possible comorbidities with ADHD. Children with intellectual disability were excluded from the study. Family dynamics like family type, family size, socio-economic status, parental educational and occupational status, family relationships, parental discord, and history of psychiatric illness in family were explored via self-structured interview-based questionnaire. The data obtained was analyzed using SPSS v. 21.0.

**RESULT:** The cumulative mean age of the sample of ADHD children stood at 7.6 years (SD  $\pm$  0.52). Most of the sample of the children hailed from urban (64.3%) areas and were raised in joint families (71.4%). Consanguinity was common among the parents (72.8%) and especially prevalent among the ADHD children with co-morbid CD. The key features that were notably high among families of the children with comorbid CD included positive parental psychiatric history, ADHD among siblings and parental discord.

**CONCLUSION:** After careful consideration, it can be concluded that consanguinity of parents, joint family system. And family history of psychiatric disorder affects the occurrence of comorbidity of conduct disorder among children with ADHD.

**KEYWORDS:** Attention Deficit Hyperactive Disorder, Conduct Disorder, Parental Discord, Family Dynamics, and Consanguinity.

## INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD), a neurodevelopmental disorder, manifests a triad of core symptoms, namely: (i) Inattention, (ii) Hyperactivity, and (iii) Impulsivity.<sup>[1]</sup> Etiological factors of this disorder have long been studied, and identified to lie in nature and nurture. Biological factors having strong association with the development of this disorder can be classified to be either physiological, and biochemical involving deficiency of Dopaminergic activity in prefrontal cortex; or genetic, which affects dopaminergic system genes. DAT1 in particular and other genes for monoamines.<sup>[2]</sup> Studies have clarified that these biological determinants may sometimes are proven not to be the sole causative factors. Environmental factors, such as childhood adversities, poor socioeconomic conditions, maternal smoking, otitis media, zinc deficiency, and parental rearing practices and family conflicts, and many others have significant influence on the development of disorder.<sup>[3]</sup>

Children with ADHD are more likely to have other mental health and neurodevelopmental conditions.<sup>[4]</sup> Most children with this disorder have at least 1 comorbid disorder i.e., 33% have 1, up to 16% have 2, and an estimated 18% had 3 or more comorbid disorders.<sup>[5]</sup> Multiple comorbidities attached to ADHD further complicates the efforts to pinpoint the etiological determinants.

Among clinic-referred children, comorbidity is frequently found between ADHD and conduct disorder (CD). Above all, 27% children with ADHD have Conduct Disorder versus 2% without ADHD.<sup>[6]</sup> The relationships of children with conduct disorder with peers and adults are often poor.<sup>[8]</sup> Rates of depression, suicidal ideation and suicide are all higher among such children and according to a survey, 42.3% of all school going children in a major metropolis of Pakistan were suffering from Conduct Disorder.<sup>[8]</sup>

However, little is known regarding the association between the co-occurrence and external factors. One factor that has recently sparked interest is family dynamics. Family is a potent factor

with a dual influence (biological and environmental). Many researchers have studied the biological links between family members that suffer from ADHD and just as many researchers have investigated the effect of the child's environment (which is largely modulated by the family).<sup>[9]</sup> Though the two often overlap and the influence is hard to stratify, the effects of the either of the two are believed to be no less significant than the other.

Be it genetic factors, or environmental influences, both are believed to play a role in the noticeable association via epigenetic mechanisms. While the genetic factors cast their impact via maternally inherited X-chromosomal factors or mitochondrial genome,<sup>[10]</sup> the environmental factors are ever-present and always exert their influence, e.g., during the pre-partum period (maternal stress, adverse effects of drugs and obstetric complications), the post-partum period and throughout the child's life.<sup>[11]</sup>

A model of gene-environment interaction, is now largely being considered in this regard that suggests a promising framework within which to conceptualize family influences on causal pathways and correlates of CD.<sup>[12]</sup> The complex relationship of family dynamics with ADHD afflicted children with and without comorbid conduct disorder continues to elude. This association merits to be studied further. This research thus hopes to generate valuable observational data that may serve as a basis for future in-depth research.

## METHODOLOGY

A Case control study was designed as a part of large scale genetic study on children with Attention Deficit Hyperactivity Disorder. We selected specific measurable determinants of family dynamics **including 1. Family type, 2. Family size, 3. Socio-economic status, 4. Parental educational and 5. Occupational status, 6. Family relationships, 7. Parental discord, and 8. history of psychiatric illness in family**, with the objective in mind to explore the differences among children with diagnosis of ADHD with and without comorbid conduct disorder and influence of catchment area and gender on these differences. After taking written informed consent from parents of children diagnosed with ADHD, the children were re-evaluated using the Diagnostic & Statistical Manual (DSM) - V criteria. Children with intellectual disability were excluded from the study. A sample of 114 disordered children was selected from July 2017 to June 2019 at the Liaquat University Hospital & Sir Cowasjee Jehangir Institute of Psychiatry. Vanderbilt Parent Rating Scale was also used to screen for possible comorbidities with ADHD. Selected determinants of family dynamics were recorded from the parents of children with and without comorbid ADHD using a semi-structured interview based questionnaire. The data obtained was analyzed using SPSS v. 21.0.

## RESULTS

The cumulative mean age of the sample of ADHD children stood at 7.6 years ( $SD \pm 0.52$ ). The sample was predominantly male (80.68%), with only a few females in the sample. Most of the sample of ADHD children hailed from urban (64.3%) areas and were raised in joint families (71.4%).

| PERSONAL DEMOGRAPHIC CHARACTERISTIC |             | ADHD without any Co-Morbidities (n = 49) | ADHD e CD (n = 39) | P - Value |
|-------------------------------------|-------------|------------------------------------------|--------------------|-----------|
| Gender                              | Male (71)   | 28 (77.6%)                               | 33 (84.6%)         | 0.27      |
|                                     | Female (17) | 11 (22.4%)                               | 06 (15.4%)         | 0.07      |
| Catchment                           | Urban (56)  | 32 (65.3 %)                              | 24 (61.5 %)        | 0.32      |
|                                     | Rural (32)  | 17 (34.7 %)                              | 15 (38.5 %)        | 0.12      |

Table 1: Majority of the patients were male in origin with urban catchment predominance.

The Comorbidity Distribution is depicted below

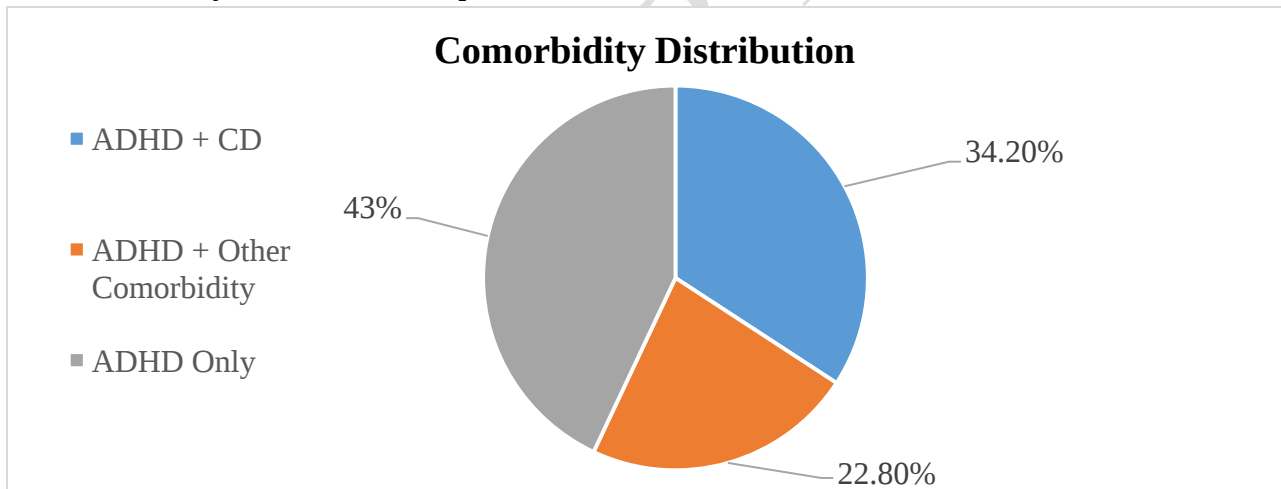


Figure 1: Only 43% of the sample reported ADHD solely, while the rest reported it with either CD or other comorbidities.

The key features that were notably high among families of ADHD children with comorbid CD included: (i) Positive Parental Psychiatric History, (ii) ADHD among Siblings, (iii) Parental Discord and (iv) Consanguinity among the Parents (72.8%). Other detailed are tabulated below:

| FAMILY CHARACTERISTIC VS GENDER DISTRIBUTION |                    |        | ADHD without any Co-Morbidities (n = 49) | ADHD e CD (n = 39) | P Value |
|----------------------------------------------|--------------------|--------|------------------------------------------|--------------------|---------|
| Family Type                                  | Joint              | Male   | 20 (40.8%)                               | 23 (59%)           | 0.08    |
|                                              |                    | Female | 5 (10.2%)                                | 2 (5.1%)           | 0.07    |
|                                              | Nuclear            | Male   | 16 (32.7%)                               | 12 (30.8%)         | 0.23    |
|                                              |                    | Female | 8 (16.3%)                                | 2 (5.1%)           | 0.4     |
| Consanguineous Marriage of Parents           | Consanguineous     | Male   | 32 (65.3%)                               | 25 (64.1%)         | 0.5     |
|                                              |                    | Female | 5 (10.2%)                                | 3 (7.7%)           | 0.2     |
|                                              | Non-Consanguineous | Male   | 9 (18.4%)                                | 5 (12.8%)          | 0.6     |
|                                              |                    | Female | 3 (6.1%)                                 | 6 (15.4%)          | 0.09    |
| Psychiatric Illness in Parents               | Positive           | Male   | 8 (16.3%)                                | 5 (12.8%)          | 0.08    |
|                                              |                    | Female | 2 (4.1%)                                 | 9 (23%)            | 0.01*`  |
|                                              | Negative           | Male   | 37 (75.5%)                               | 21(53.8%)          | 0.31    |
|                                              |                    | Female | 2 (4.1%)                                 | 4 (10.2%)          | 0.2     |
| History of ADHD in Siblings                  | Present            | Male   | 2 (4.1%)                                 | 3 (7.7%)           | 0.7     |
|                                              |                    | Female | 1 (2%)                                   | 4 (10.2%)          | 0.01*   |
|                                              | Absent             | Male   | 41 (91.7%)                               | 25 (64.2%)         | 0.2     |
|                                              |                    | Female | 5 (10.2%)                                | 7 (17.9%)          | 0.7     |
| Parental Discord                             | Present            | Male   | 5 (10.2%)                                | 8 (20.6%)          | 0.53    |
|                                              |                    | Female | 4 (8.2%)                                 | 6 (15.4%)          | 0.1     |
|                                              | Absent             | Male   | 37 (75.5%)                               | 21 (53.8%)         | 0.2     |
|                                              |                    | Female | 3 (6.1%)                                 | 4 (10.2%)          | 0.08    |

Table 2: \* Statistically significant

| FAMILY CHARACTERISTIC                 |                          | ADHD without any<br>Co-Morbidities (n = 49) | ADHD e CD<br>(n = 39) | P Value |
|---------------------------------------|--------------------------|---------------------------------------------|-----------------------|---------|
| Family Type                           | Joint                    | 23 (47 %)                                   | 27 (69.2 %)           | 0.08    |
|                                       | Nuclear                  | 26 (53 %)                                   | 12 (30.8 %)           | 0.07    |
| Paternal Educational Level            | Not Formally<br>Educated | 8 (16.3%)                                   | 7 (18%)               | 0.07    |
|                                       | Primary                  | 14 (28.6%)                                  | 9 (23%)               | 0.09    |
|                                       | Secondary                | 7 (12.3%)                                   | 6 (15.4%)             | 0.08    |
|                                       | Intermediate             | 15 (30.6%)                                  | 10 (25.6%)            | 0.06    |
|                                       | Bachelors                | 2 (4.1%)                                    | 4 (10.7%)             | 0.9     |
|                                       | Masters                  | 3 (6.1%)                                    | 3 (7.7%)              | 0.7     |
|                                       |                          |                                             |                       |         |
| Maternal Educational Level            | Not Formally<br>Educated | 13 (26.5%)                                  | 18 (46.1%)            | 0.3     |
|                                       | Primary                  | 11 (22.4%)                                  | 5 (12.8%)             | 0.1     |
|                                       | Secondary                | 2 (4.1%)                                    | 3 (7.7%)              | 0.08    |
|                                       | Intermediate             | 18 (36.8%)                                  | 7 (20%)               | 0.07    |
|                                       | Bachelors                | 4 (8.1%)                                    | 3 (7.7%)              | 0.5     |
|                                       | Masters                  | 1 (2%)                                      | 3 (7.7%)              | 0.4     |
|                                       |                          |                                             |                       |         |
| Consanguineous Marriage of<br>Parents | Consanguineous           | 37 (75.5 %)                                 | 28 (71.8 %)           | 0.41    |
|                                       | Non-Consanguineous       | 12 (24.5 %)                                 | 11 (28.2 %)           | 0.06    |
| Psychiatric Illness in Parents        | Positive                 | 9 (18.4 %)                                  | 15 (38.5 %)           | 0.01*   |
|                                       | Negative                 | 40 (81.6 %)                                 | 24 (61.5 %)           | 0.23    |
| History of ADHD in Siblings           | Present                  | 3 (6.1 %)                                   | 7 (18 %)              | 0.01*   |
|                                       | Absent                   | 46 (93.9 %)                                 | 32 (82 %)             | 0.4     |
| Parental Discord                      | Present                  | 6 (12.2 %)                                  | 17 (43.6 %)           | 0.03*   |
|                                       | Absent                   | 43 (87.7 %)                                 | 22 (56.4 %)           | 0.15    |

.Table 3: The probability of having a parent with psychiatric illness or a sibling with ADHD was statistically higher among female ADHD patients.

| FAMILY CHARACTERISTIC VS CATCHMENT DISTRIBUTION |                    |       | ADHD without Co-Morbidities (n = 49) | ADHD e CD (n = 39) | P Value |
|-------------------------------------------------|--------------------|-------|--------------------------------------|--------------------|---------|
| Family Type                                     | Joint              | Urban | 10 (20.4%)                           | 21 (53.8%)         | 0.4     |
|                                                 |                    | Rural | 15 (30.6%)                           | 4 (10.2%)          | 0.31    |
|                                                 | Nuclear            | Urban | 16 (32.7%)                           | 9 (23%)            | 0.2     |
|                                                 |                    | Rural | 8 (16.3%)                            | 5 (12.8%)          | 0.7     |
| Consanguineous Marriage of Parents              | Consanguineous     | Urban | 29 (59.2%)                           | 13 (33.3%)         | 0.2     |
|                                                 |                    | Rural | 14 (28.6%)                           | 9 (23%)            | 0.7     |
|                                                 | Non-Consanguineous | Urban | 3 (6.1%)                             | 11 (28.2%)         | 0.6     |
|                                                 |                    | Rural | 3 (6.1%)                             | 6 (15.4%)          | 0.2     |
| Psychiatric Illness in Parents                  | Positive           | Urban | 2 (4.1%)                             | 9 (23%)            | 0.01*   |
|                                                 |                    | Rural | 5 (10.2%)                            | 8 (20.6%)          | 0.5     |
|                                                 | Negative           | Urban | 29 (59.1%)                           | 16 (41%)           | 0.4     |
|                                                 |                    | Rural | 13 (26.6%)                           | 6 (15.4%)          | 0.41    |
| History of ADHD in Siblings                     | Present            | Urban | 1 (2%)                               | 3 (7.7%)           | 0.01*   |
|                                                 |                    | Rural | 3 (6.1%)                             | 3 (7.7%)           | 0.7     |
|                                                 | Absent             | Urban | 19 (38.8%)                           | 27 (69.2%)         | 0.3     |
|                                                 |                    | Rural | 26 (53%)                             | 6 (15.4%)          | 0.06    |
| Parental Discord                                | Present            | Urban | 2 (4.1%)                             | 8 (20.6%)          | 0.01*   |
|                                                 |                    | Rural | 6 (12.2%)                            | 7 (17.9%)          | 0.4     |
|                                                 | Absent             | Urban | 23 (47%)                             | 17 (43.6%)         | 0.08    |
|                                                 |                    | Rural | 18 (36.7%)                           | 7 (17.9%)          | 0.1     |

Table 4: An urban catchment was notably higher among patients with a psychiatric history of parents or history of ADHD among siblings.

## DISCUSSION

This research hoped to study the family dynamics of ADHD afflicted children, with and without conduct disorder, (using a structured – interview-based questionnaire, the Diagnostic & Statistical Manual (DSM) – 5 and the Vanderbilt Parent Rating Scale), with the purpose to shed light on the widely overlooked family dynamics and filling the void in local and international literature regarding the much-needed insight into this matter.

The study slices up the family characteristics and deals with the issue not as a whole so that each factor may be explored individually. Consanguinity was common among the parents (72.8%) and especially prevalent among ADHD children with co-morbid CD. This finding is backed by evidence-based literature, by researchers such as Bener A, et al (2008), who report that prevalence of ADHD and comorbidity is considerably higher in consanguineous communities (Up to 11.1%).<sup>[13]</sup>

Eapen V, et al (2004) claims that socioeconomic status too is contributor for conduct disorder among children with ADHD, and though this research did not delve into many socioeconomic details; it did reveal that consanguinity is similarly practiced in the Pakistan urban and rural centers with catchment exerting statistically significant influence.<sup>[14]</sup> Toupin J, et al (2000) too, revealed that controlling this factor (socioeconomic status), does not negate other relationships, suggesting that other strong factors too might be involved.<sup>[15]</sup>

Our research revealed key features that were notably high among families of the disordered children with comorbid CD included positive parental psychiatric history, ADHD among siblings and parental discord. This is seconded by Stein MT, et al (2001), who reveals that ADHD children whose parents are divorced or not in a favorable relationship do not get proper attention and care from their parents, and this leads to a higher incidence of comorbid conduct disorder.<sup>[16]</sup>

Others such as Schachar RJ, et al (1991), add weightage to this factor via the observation that ADHD + CD was associated with both dysfunctional parent-child relationships and moderate adversity.<sup>[17]</sup> Killic BG, et al (2005), too reports similar claims, i.e., maternal depression and paternal drinking is commonly noted among families of ADHD afflicted children with comorbid CD. The author also revealed that high scores with regards to 'unhealthy functioning' were obtained in the "Roles and Behaviour Control Subscales of the FAD".<sup>[18]</sup>

The findings of Hurtif T (2007), further cement the previous beliefs that the families of ADHD afflicted children with comorbid disorder are more disturbed than those without the said comorbidity. Hurtif T (2007) claims that "compared to adolescents with ADHD alone those with ADHD and comorbidity lived significantly more commonly in non-intact families, in low-income families, with mothers who were dissatisfied with life and with parents who showed little interest in their adolescents' activities".<sup>[19]</sup>

It is interesting to note that female children (with ADHD) were facing a greater ( $p = 0.01^*$ ) probability of having parents with psychiatric illness. Though it is known since early 1970s by the work of Cantwell DP that 10% of the parents of the hyperactive children had been hyperactive themselves during their childhood, and, upon testing – the entirety of this 10%; test positive for psychiatric illness (with alcoholism, sociopathy, or hysteria); leading us to believe that ADHD is indeed pass in generations.<sup>[20]</sup>

However, no research justifies a female preponderance or a greater likelihood of inheriting this illness faced by girls. On the contrary, the work of Biederman J (2002); suggests the opposite

and states that though “gender modified the risk for adverse cognitive and interpersonal outcomes; boys were more vulnerable to the disorder than girls”.<sup>[21]</sup>

In addition to genetics, this affect may have roots in the environment as well. The manner girls are brought up in our society is different to boys. The fact that catchment too had similar effects on our result distribution, as did gender supports this thought and hence more research into the matter may clear this scenario for the better. Keeping in view that a holistic answer may only be yielded if a holistic biopsychosocial approach is adopted as recommended by the work of Richards LM (2012).<sup>[22]</sup>

More family characteristics may have been explored but our research was limited to the prominent few. However, we hope to adopt a more inclusive approach in future research. Consanguinity is a consistently recurring factor highlighted in many reports and is known to cause psychiatric problems among children. It should be discouraged for the well-being of future generations.

Positive parental psychiatric history too has been proven by research to translate into psychiatric problems among children, though exceptions are notable.<sup>[23]</sup> Parental counselling is thus answer to this issue. Parental discord disrupts the environment of the home and is not conducive to the healthy mental growth of children. Parents should thus settle their differences effectively and seek marriage counselling if needed.

## **CONCLUSION**

After careful consideration, it can be concluded that like all children, family disturbances of either sort impact the children adversely or increase susceptibility to psychological impairments. Children with ADHD are particularly more vulnerable and negative family characteristics make more chances for development of co-morbid CD.

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