Diagnostic Corelates of Depression Among Attention Deficit Hyperactivity Disorder (ADHD) Children

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Abstract

Background: Attention-deficit hyperactivity disorder is a syndrome of inattention, distractibility, restless, over activity, impulsiveness, and other deficits of executive function. Diagnosing major depressive disorder in children can be confronting.

Objectives: Estimation of sociodemographic characteristics and Depression among ADHD children

Methods: A cross-sectional study conducted on ADHD children attending 3 child psychiatry centers, Baghdad, Iraq. Data collected during the period March 1st, 2019 to September 1st, 2019. All ADHD children were included. Current unstable medical illnesses, not cooperative, not give their consent were excluded. Sociodemographic variables were compiled using a questionnaire filled through a direct interview. Conners’ Global Index - Parent Version used to confirm the diagnosis. Birleson Depression scale was used for diagnosis and assessment of depression.

Results: A total of 105 ADHD children, age range 6-11 years. First rank order (42.9%), not at school (64.8%), family referral (98.1%), and separated parent (6.7%), dead father (8.5%). About 60% of fathers were of low education. Employed father was 33.3%. More than half of mothers were of low education. ADHD with psychiatric comorbidity 37%. Depressed ADHD 12.4%. Significant correlation of depression was found with age group school level, states of living with parents, parents’ marital status, and traumatic events.

Conclusion: There is a significant statistical correlation of depressed ADHD with; age, school level, status of living circumstances, parent marital status, traumatic event exposure. Suggesting that stressful social circumstances may be a key mechanism und

Keywords: Attention-deficit hyperactivity disorder; Depression; Psychiatric comorbidity; Traumatic event exposure; Neurodevelopmental type; Mental disorder; Psychiatric disorders; Depressive disorders; Medical practitioners; Mental health

Introduction

Attention deficit hyperactivity disorder

Attention deficit hyperactivity disorder (ADHD) is a syndrome of inattention, distractibility, restless over activity, impulsiveness, and other deficits of executive function [1]. Attention deficit hyperactivity disorder (ADHD) is a mental disorder of the neurodevelopmental type [2]. It is characterized by difficulty paying attention, excessive activity, and behavior without regards to consequences which is not appropriate for a person’s age. There are also often problems with regulation of emotions [3]. The symptoms appear before a person is twelve years old, are present for more than six months, and cause problems in at least two settings (such as school, home, or recreational activities). In children, problems paying attention may result in poor school performance. Additionally, there is an association with other mental disorders and substance misuse [4]. Diagnosing major depressive disorder (MDD) in children (5-12 years of age) can be confronting. Important debates continue regarding the validity of psychiatric diagnoses, especially in children and adolescents. Longitudinal research, however, has continually demonstrated that most adult disorders have their origins in childhood and most childhood disorders have consequences that persist to adulthood [5]. There is evolving evidence to suggest MDD, as we currently understand it, can even exist in pre-schoolers. Over time, children with ADHD may become frustrated and demoralized because of their symptoms. They may develop feelings of a lack of control over what happens in their environment or become depressed as they experience repeated failures or negative interactions in school, at home, and in other settings. As these negative experiences accumulate, the child with ADHD may begin to feel discouraged.
Typically, in these situations ADHD symptoms appear first and the depression comes later. These negative reactions are common in individuals with ADHD and some expert claim that up to 70 percent of those with ADHD will be treated for depression at some point in their lives [6]. In addition to being saddened or demoralized because of ADHD, children may also experience a true depressive illness. To date, studies indicate that between 10-30 percent of children with ADHD may have a separate serious mood disorder like major depression [7-9].

Aims of Study

1. Estimation of sociodemographic characteristics of ADHD.
2. Estimation of prevalence of Depression among ADHD children.
3. Estimation of diagnostic correlate of depression among ADHD children.

Methods

Design and setting

This is a cross-sectional study conducted on ADHD children attending 3 child psychiatry centers in Baghdad, Iraq.

Data collected

During the period March 1st, 2019 to September 1st, 2019.

Inclusion criteria

All children with ADHD were included.

Exclusion criteria

Current serious or unstable medical illnesses that cannot complete the interview; not cooperative; and who did not give their consent to participate were excluded from the study.

Data collection Tools

Sociodemographic variables and clinical characteristics of ADHD children were compiled using a questionnaire filled through a direct interview. Conners’ Global Index-Parent Version used to confirm the diagnosis of ADHD. Ten-Item Conners’ Global Index Parent Form-CGI-P is composed of ten items used to evaluate the frequency and severity in the last week of the child’s impulsivity, emotional outbursts and motor hyperactivity. Scoring is age and gender specific. The CGI-P has an internal reliability coefficient of 0.94. A test-retest reliability coefficient over a six to eight weeks interval was 0.8 for CGI-T. Scores over 65 are in the clinical range [10]. Birleson Depression scale used for diagnosis and assessment of depression. The Depression Scale for Children was developed in 1978 as part of a Master of Philosophy Thesis at the University of Edinburgh. The scale emerged from a longer inventory of 37 items that had been described in the literature as associated with major depressive syndromes in childhood. The test-retest reliability of the Scale on an independent sample showed satisfactory stability (0.80). Individual items had a reliability coefficient of 0.65-0.95. The Scale’s corrected split-half reliability was 0.86 showing good internal consistency. The linearity of Scale items was assessed by factor analysis. A rotated matrix produced 5 factors that together shared 61% of the total variance. These factors were very similar to those found in adult studies. [11,12].

Definition of variables

The independent variables evaluated to explain depression were socio-demographics (age, gender, school level, marital status of parent, level of education of parent, occupation of parent, economic status, source of referral, living circumstances, smoking and alcohol of parent) and clinical characteristics (psychiatric comorbidity, family history of medical and psychiatric disorders, traumatic events exposure).

Statistical analysis

Statistical package of social sciences (SPSS) version 20 was used for data entry and analysis. Categorical variables were tested using chi square test. P<0.05 was considered statistically significant. Ethical Issue: Official approvals were granted from the officials in the study setting. Informed consent was obtained from each participant family to be included in this study. Names were kept anonymous and interviews were conducted with full privacy.

Results

A cross sectional study includes a total of 105 ADHD children. Male 83.8%, female 16.2%. Age 7.33±1.57. More than two third of children were age 6-7 years (65.7%). First rank order (42.9%), live in their own house (71.4%), not at school (64.8%), normally delivered (61%), half of them within middle socioeconomic status (51.5%), separated parent (6.7%), dead father (8.5%). The education of the father was; 29.5% primary school, 26.7% institutes and colleges, 21.9% intermediate school, 15.2% secondary school, and 6.7% were illiterate. About one third of father occupation was employed 33.3%, 55.2% free work. More than half of mother was of low education; 28.6% primary school and 25.7% illiterate. Occupation of mothers; 85.7% housewife, employed 12.4%. About 71.4% were without family history of chronic medical illness and 70.6% without family history of chronic mental illness. Depressed ADHD children were (12.4%) [13]. About 50% of Depression found in age group below 10 years, mostly male (69.2%), living in illegal houses were 15.3% of depressed child. The level of school shows more depressed in those not at school 46% and the second class 23%. Most depressed children were the first rank order among siblings (55.8%), normal labor (69.2%). About 46.1% live with mother, 38.5% live with both parents, and 15.4% live with grandparents. The economic status was low 46.1%, middle 38.5%, and high 15.4% the parent marital status; married and live together were 46.1% separated parent 38.5%, and dead father 15.4%, the education of parents of depressed ADHD children; father education were institutes and colleges 46.1%, primary school 30.8%, intermediate school 15.4%,
and illiterate 7.7%. Mother education was colleges and institutes 38.5%, primary school 23.1%, illiterate 23.1%. The occupation of father was; free work 46.1%, and employed 23.1%. The occupation of mother 92.3% were housewife and 7.7% employed. Family history of medical illnesses was 30.8% and family history of psychiatric illnesses 38.5%. The psychiatric comorbidity was 30.8%. The exposure to traumatic events was 15.4%. There is a significant statistical correlation of depression with: age group (P<0.001), school level of the child (P=0.048), the status of living weather both parent, mother, or grand-mother (P<0.001), parent marital status (P<0.001), traumatic event (P=0.048) (Tables 1-4) (Figure 1).

Figure 1: Depression among ADHD Children.

Table 1: The sociodemographic and clinical characteristic of the ADHD children involve in the study

| The Sociodemographic and Clinical Characteristic of the ADHD Children involve in the Study No. | Total (105) |
|-----------------------------------------------|-------------|
|                                               | %           |
| Gender                                        |             |
| Male                                          | 88          | 83.8 |
| Female                                        | 17          | 16.2 |
| Age Group                                     |             |
| 6 - 7 Years                                   | 69          | 65.7 |
| 8 - 9 Years                                   | 20          | 19.1 |
| 10 - 11 Years                                 | 16          | 15.2 |
| Rank Order                                    |             |
| First                                         | 45          | 42.9 |
| Second                                        | 23          | 21.9 |
| Third                                         | 12          | 11.4 |
| Above Third                                   | 25          | 23.8 |
| Housing state                                 |             |
| own house                                     | 75          | 71.4 |
| Rented house                                  | 19          | 18.1 |
| Illegal house                                 | 11          | 10.5 |
| School level                                  |             |
| Not at school                                 | 68          | 64.8 |
| First Class                                   | 15          | 14.3 |
| Second Class                                  | 14          | 13.3 |
| Third Class                                   | 1           | 0.9 |
| Fourth Class                                  | 4           | 3.8 |
| Fifth Class                                   | 3           | 2.9 |
| Source of Referral                            |             |
| Family Referral                               | 103         | 98.1 |
| School Referral                               | 2           | 1.9 |
| Delivery                                      |             |
| Normal                                        | 64          | 61   |
| Caesarian Section                             | 41          | 39   |
Table 2: Mean and standard deviation, minimal and maximal values of age, Conners’ scale, and Berelson depression scale.

|                          | Age     | Conners  | Berelson |
|--------------------------|---------|----------|----------|
| Mean                     | 7.3333  | 22.781   | 12.8     |
| Std. Deviation           | 1.57301 | 3.69506  | 5.35185  |
| Minimum                  | 6       | 16       | 6        |
| Maximum                  | 11      | 30       | 29       |

Table 3: Frequency and percentage of depression among ADHD children included in this study.

|                          | No. | %   |
|--------------------------|-----|-----|
| Not Depressed            | 92  | 87.6|
| Depressed Child          | 13  | 12.4|
| Total                    | 105 | 100 |

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### Table 4: The correlation of depression with sociodemographic and clinical characteristics of the ADHD children.

|                     | Not Depressed (92) | Depressed (13) | Total(105) | P value |
|---------------------|--------------------|----------------|------------|---------|
|                     | No. (% | No. (% | No. (% |         |
| **Age Group**       |        |        |         |         |
| 6 - 7 Years         | 64 (69.6 | 5 (38.5 | 69 (65.7 | 0.000 |
| 8 - 9 Years         | 19 (20.6 | 1 (7.7 | 20 (19.1 |         |
| 10 - 11 Years       | 9 (9.8 | 7 (53.8 | 16 (15.2 |         |
| **Gender**          |        |        |         | 0.127 |
| Male                | 79 (85.9 | 9 (69.2 | 88 (83.8 |         |
| Female              | 13 (14.1 | 4 (30.8 | 17 (16.2 |         |
| **Housing state**   |        |        |         | 0.524 |
| own house           | 65 (70.6 | 10 (77 | 75 (71.4 |         |
| Rented house        | 18 (19.6 | 1 (7.7 | 20 (19.1 |         |
| Illegal house       | 9 (9.8 | 2 (15.3 | 11 (10.5 |         |
| **School Level**    |        |        |         | 0.048 |
| Not at school       | 62 (67.4 | 6 (46.1 | 68 (64.8 |         |
| First Class         | 14 (15.2 | 3 (23.1 | 15 (14.3 |         |
| Second Class        | 11 (11.9 | 3 (23.1 | 14 (13.3 |         |
| Third Class         | 1 (1.1 | 0 (0 | 1 (0.9 |         |
| Fourth Class        | 3 (3.3 | 1 (7.7 | 4 (3.8 |         |
| Fifth Class         | 1 (1.1 | 2 (15.4 | 3 (2.9 |         |
| **Source of Referral** |        |        |         |         |
| Family Referral     | 90 (97.8 | 13 (100 | 103 (98.1 | 0.591 |
| School Referral     | 2 (2.2 | 0 (0 | 2 (1.9 |         |
| **Rank Order**      |        |        |         | 0.522 |
| First               | 38 (41.3 | 7 (53.8 | 45 (42.9 |         |
| Second              | 20 (21.7 | 3 (23.1 | 23 (21.9 |         |
| Third               | 10 (10.9 | 2 (15.4 | 12 (11.4 |         |
| Above Third         | 24 (26.1 | 1 (7.7 | 25 (23.8 |         |
| **Delivery**        |        |        |         | 0.513 |
| Normal              | 55 (59.8 | 4 (30.8 | 59 (56.1 |         |
| Caesarian Section   | 37 (40.2 | 4 (30.8 | 41 (39 |         |
| **Live With**       |        |        |         | 0.000 |
| Both Parent         | 85 (92.4 | 5 (38.5 | 90 (85.7 |         |
| Mother              | 3 (3.3 | 6 (46.1 | 9 (8.6 |         |
| Grand Mother        | 4 (4.3 | 2 (15.4 | 6 (5.7 |         |
| **Economic Status** |        |        |         | 0.544 |
| Low                 | 29 (31.5 | 6 (46.1 | 35 (33.3 |         |
| Middle              | 49 (53.3 | 5 (38.5 | 54 (51.5 |         |
| High                | 14 (15.2 | 2 (15.4 | 16 (15.2 |         |
| **Parent Status**   |        |        |         | 0.000 |
| Married(Together)   | 83 (90.2 | 6 (46.1 | 89 (84.8 |         |
| Separated           | 2 (2.2 | 5 (38.5 | 7 (6.7 |         |
| Dead Father         | 7 (7.6 | 2 (15.4 | 9 (8.5 |         |
| **Education Father** |        |        |         | 0.320 |
| Illiterate          | 6 (6.5 | 1 (7.7 | 7 (6.7 |         |
| Primary             | 27 (29.4 | 4 (30.8 | 31 (29.5 |         |
| Intermediate        | 21 (22.8 | 2 (15.4 | 23 (21.9 |         |
| Secondary           | 16 (17.4 | 0 (0 | 16 (15.2 |         |
| Institute and College | 22 (23.9 | 6 (46.1 | 28 (26.7 |         |
| **Occupation Father** |        |        |         | 0.184 |
| Free                | 52 (56.5 | 6 (46.1 | 58 (55.2 |         |
| Employed            | 32 (34.8 | 3 (23.1 | 35 (33.3 |         |
| Military            | 2 (2.2 | 1 (7.7 | 3 (2.9 |         |
| Retired             | 1 (1.1 | 1 (7.7 | 2 (1.9 |         |
| Dead Father         | 5 (5.4 | 2 (15.4 | 7 (6.7 |         |
The 12-month prevalence of MDEs increased from 8.7% in 2005 to 11.3% in 2014 in childhood [19]. Lima et al. [20]: Depressive disorders among children prevalence of 0.3% to 7.8% in children below 13 years old [20]. In Brazil, the prevalence of childhood depression among children below 14 years old varies from 0.2% to 7.5% according to the assessment method used [21-23]. Egger & Angold [24]: Depression is relatively uncommon in pre-pubertal children (1-2%) and rates differ little between boys and girls [24].

The result of this study is within the accepted range of many studies. Moffitt et al. [25]: prevalence of major depressive disorders range from 10%-17%. Furman L [26] estimates of the prevalence of depression among patients with ADHD range from 13% to 27%, while clinical sample reports have run as high as 60%-25. Conversely, among children and adolescents with depression, various studies have reported widely varying rates of ADHD (from less than 5% to more than 50%); a recent study in very young children reported a rate of 42% [26,27]. Spencer T [28]: A total of 10-40% of children with ADHD shows depression with symptomology of low or irritated mood, loss of interest and reduced appetite [27,28].

There is a significant statistical correlation of depression with: age group (P<0.001), school level of the child (P=0.048), the status of living weather both parent, mother, or grand-mother (P<0.001), parent marital status (P<0.001), traumatic event (P=0.048). The family variable of ADHD in this study that was found to be positively correlated with ADHD was having parents who were divorced or being a child of a single parent (P<0.001). Reduced family cohesion and chronic conflict may adversely affect marital or partner relationship resulting in the dissolution of the marriage. Divorce is permissible in the culture and religion of people in Iraq and it may explain this finding. This finding agreed with the report by Biederman et al. [29] from a similar study.
study who found that reduced family cohesion, chronic conflict and parental psychopathology are associated with ADHD. This is further supported by findings from Fischer [30]. The reason for this might be because people in the study setting would not like to discuss issues about their marriage with strangers, even if they were medical practitioners, for cultural reasons [30].

Conclusion

ADHD, the most common diagnosis in child psychiatry, appears to be more challenging to diagnose when there is a comorbid depressive disorder. There is a significant statistical correlation of depression of ADHD children with; age, school level, status of living circumstances; weather parent, mother, or grand-mother; parent marital status, traumatic event exposure.

Recommendations

It is important to consider depression when interviewing children with ADHD. Prevention, early detection, and treatment of depression and other common mental disorders in childhood age groups are major goals of public mental health initiatives. Adaptation and broad implementation of effective treatment and prevention programs remains a challenge. The growing number of depressed children who do not receive any mental health treatment calls for renewed outreach efforts, especially in school mental health and counselling services and paediatric practices where many of the untreated depression may be detected and managed. More studies need to be done to verify the relationship of one disorder with another if the individual who has depression can have ADHD, and verify the causality between depression and being ADHD.

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