

Bipolar Mood Disorder Among Children of Attention Deficit Hyperactivity Disorder

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Abstract

Bipolar mood disorder is one of the most difficult disorders to recognize in children because it does not fit precisely the adult criteria. Since there is overlap regarding major symptoms between Bipolar Mood disorder and Attention Deficit Hyperactivity disorder in children, we hypothesized that Attention Deficit Hyperactivity disorder is over diagnosed and Bipolar Mood disorder is under diagnosed. One hundred and twenty children have the diagnosis of Attention Deficit Hyperactivity disorder were reevaluated for Bipolar Mood disorder using DSM-IV-TR., Conner's Rating Scale, Achenbach's Child Behavior Checklist, Clinical Administered Rating Scale for Mania and Parent Version of the Young Mania Rating Scale. Out of 120 Attention Deficit Hyperactivity disorder Children, 45 children (37.5%) were re-diagnosed and met the criteria of Bipolar Mood disorder. There were statistical significant difference between the two groups regarding gender, type of school, family history of Bipolar Mood disorder and social and sport participation. We concluded that Bipolar Mood disorder can be misdiagnosed in children as Attention Deficit Hyperactivity disorder so these children will not receive their proper management and be socially impaired with high level of behavioral difficulties, school failure and poor academic performance.

Introduction

Although bipolar mood disorder (BPD), is probably the most prevalent psychotic disorder in adults, it has been relatively neglected in children and adolescents over the past century (Anthony and Scott, 2000). The literatures on early onset BPD that estimated prevalence, particularly before puberty, is limited by historical biases against pediatric mood disorders and by formidable diagnostic complexity and co morbidity (Weinberg and Brumback, 1976). Although clinical features of pediatric and adult BPD have similarities, pediatric cases probably cannot be defined solely by features characteristic of adult cases. Onset was before age 20 years in at least 25% of reported BPD cases, with some increase in this incidence over the past century (Carlson, 1999). Pediatric BPD episodes frequently include irritability, dysphoria, or psychotic symptoms; they are commonly

chronic and carry high risks of substance abuse and suicide. BPD is often recognized in adolescents, but the syndrome or its antecedents are almost certainly under recognized and under treated in children (Weller, *et al.*, 2001; Adler, *et al.*, 2005; Faraone, *et al.*, 2005; Kowatch, *et al.*, 2005; Udal and Groholt, 2006). Controlled studies of short and long term treatment, course, and outcome regarding BPD remain strikingly limited, and the syndrome urgently requires increased clinical and scientific interest. The relationship between BPD and attention-deficit hyperactivity disorder (ADHD) in children has been one of the most hotly debated topics in recent child psychiatry (Giedd, 2003). At the heart of matter, there is a large numbers of children with bipolar disorder are being unrecognized or misdiagnosed (Pliszka, 2001). It was reported that the most

diagnostic clinical dilemmas seem to arise in child psychiatry from overlapping symptomatology between BPD and ADHD (Sachs, *et al.*, 2003). Prominent hyperactivity and impaired concentration in ADHD make a problem in differential diagnosis with early BPD, and the two are strongly related. Since these disorders share features, misdiagnosis may occur, probably more often in children than in adolescents (Biederman, *et al.*, 2002). A recent study helps to clarify this relationship: 91% of children evaluated with current or previous mania also met criteria for ADHD, while only 19% with a diagnosis of ADHD also met DSM-VI-TR criteria for current or previous mania. Similar diagnostic criteria persisted even after elimination of obviously similar symptoms found in both disorders, such as hyperactivity, talkativeness, and distractibility (Wozniak, *et al.*, 2003; Adler, *et al.*, 2005; Faraone, *et al.*, 2005; Kowatch, *et al.*, 2005; Udal and Groholt, 2006). Hyperactivity, impulsivity, and inattention are seen in children with ADHD and BPD, but these two disorders are radically different in terms of the impact that they have on a child's life. Determining causes of child behavioral problems is extremely important. ADHD is far less severe regarding impairment than BPD. The most important problems for an ADHD child are how to slow down, focus, and organize his life. The most important problem for a child with BPD is how to manage his mood shift from potentially destructive hypomania, to a depression, so dark that it can be paralyzing or suicidal (Akiskal, 2000). It may be difficult to distinguish bipolar disorder from ADHD. Ninety eight percent of children with the diagnosis of BPD also qualify for the diagnosis of ADHD because of the presence of inattention, impulsivity, and

hyperactivity which are seen in the ADHD patients (Wozniak, *et al.*, 2003). Conversely, twenty two percent of those children diagnosed with ADHD fit the criteria for BPD (Butler, *et al.*, 2000). It is extremely important to identify children with dual diagnosis (BPD and ADHD) in order to receive proper management and get better quality of life. We have to test the hypothesis that ADHD may be a childhood version of BPD among some children and to study the impact of BPD among children on their social competencies, behavioral, and academic performance.

Subjects and Methods

Subjects:

A cross sectional comparative study was carried out over one year period on children attending the Neuropsychiatry Outpatient Clinic in Suez Canal University Hospital. One hundred and twenty children coming for follow up of their ADHD, diagnosed according to DSM-IV-TR criteria without co morbid psychiatric disorder, were included in our study. Our group study had fulfill the following including criteria: children aged 6-12 years old, the child must be accompanied by at least one of his or her parents and consent was obtained from one of the parents. Children with epilepsy, other apparent neurological manifestations or any sign or symptom suggestive of physical disorder were excluded from the study.

Sampling strategy:

Woolston and Mayes (2001) study the rates of bipolar disorder in a group of ADHD in child Neuropsychiatry Outpatient they found that 23% children how diagnosed as ADHD were re-diagnosed and met the criteria for BPD. Z X p (1 - p)

The sample size was 120 children according to the following equation: $N = -D^2$

Methods:

Children in our study were examined and subjected to: fully detailed psychiatric sheet designed in our psychiatry department, using DSM-IV-TR diagnostic criteria. The interview with one or both parents, the evaluation included observation of the child behavior, the child parent interaction and the separation process. Parents were asked to fill the questionnaires independently. Those who can not read were helped by the interviewers.

Methodological Tools :

I- Conner's Rating Scale

It is one of the most widely used scales in rating behavior. A total score is derived from the scale and the cut off score of 15 has been established as the point that confirms the presence of ADHD since it is very much above the scores received by normal children (Conner, 1969). Conner's scale appears to distinguish with good and accepted precision between normal and hyperactive disturbed children. In order to facilitate the practical use of this scale it was translated to Arabic language and was given to referees to comment on the adequacy and fluidity of the items compared to the original version (El-Defrawi, *et al.*, 1992). In Egypt, Conner's ADHD scale, when applied to children diagnosed as having ADHD, appeared to be very effectively differentiating them from children with no psychiatric complaints. However, the score of 15 is low especially for young children (6-8 years) and in spite of statistical distinction between normal children and children referred for ADHD, it may lead to identification of false positive for this reason, El Defrawi, *et al.*, (1992)

have suggesting raising the cut off score for behavioral problems up to 19 points.

II- Achenbach's Child Behavior Checklist (CBCL) (1982)

The Child Behavior Checklist (CBCL) was developed by Achenbach, (1979) and modified by Achenbach and Edel-brock, (1983). It was designed to provide mental health professionals with a reliable means of assessing the behavior problems and social competencies of children referred for treatment. More recently direct observation Achenbach, (1988), revised the method of scoring of the parent CBCL and extended the range of scores on each behavior problem scales. In epidemiological studies it is used as a screening instrument for case identification (Bird, *et al.*, 1987). Another version was done by Achenbach and Edel-brock, (1991), it is one of the most extensively used parent report questionnaires that assess social competencies and behavioral problems among children aged 4 to 18 years old (Achenbach and Edel-brock, 1983; 1991). The CBCL is designed to obtain standardized parents report of children's problems and competency. It is for ages 4 to 18 and can be completed in 15 to 17 minutes. Rigorous cross-cultural comparisons of CBCL data have been reported on children from USA, Holland, Thailand, Australia and French (Achenbach and Edel-brock, 1987; Verhulst, *et al.*, 1995; Offord, 1995). According to Achenbach and Edel-brock, (1991), maternal reports were compared with initial teacher reports and the means of both were used to contrast differences between boys and girls. The CBCL is designed to be self-administered by parents who have at least fifth grade reading skills, but it can also be administered by an interviewer. Arabic

version of CBCL was done by El Defrawi, *et al.*, (1991), the instrument was initially translated into Arabic for use with Egyptian parents; the translation was reviewed by child psychiatrists and clinical psychologists who are fully bilingual. After being modified in the course of this review, the instrument was back translated by a professional translator from the university, the bilingual mental health professionals reviewed the back translation to ensure that the connotations of the original CBCL items were accurately captured and vernacular expressions were added where necessary to facilitate understanding. Achenbach's child behavior checklist, contains 113 items for which a parent and/or teacher uses a three-point scale to rate each behavior. According to the parent report:

A) Internalizing factors are anxious, schizoid, depressed, uncommunicative, obsessive compulsive, somatic complaint and social withdrawal. **B) Externalizing factors** are hyperactive, aggressive and delinquent. Since the norms for the CBCL are based on no clinical (normal) samples, the CBCL may be used to determine whether a child exhibits unusual or excessive behaviors relative to normal children.

III- Clinician-Administered Rating Scale for Mania (CARS-M):

The CARS-M is a 15-item clinician-administered scale designed to assess the severity of both manic and psychotic symptomatology in children. Most items are scored from 0 (absent) to 5 (symptom present to severe degree), based on increasing severity. One item is scored from 0 to 4. The CARS-M takes approximately 15-30 minutes to administer (Pavuluri, 2002). The CARS-M may be used to assess

the severity of a manic state for either clinical or research purposes. Because it is compatible with DSM-IV criteria, it may be used to evaluate the presence of manic symptoms in order to facilitate diagnostic assessment. Psychotic symptoms also may be assessed with the CARS-M. For studies investigating patient responses to clinical treatment, the CARS-M can provide a reliable measure of efficacy. This rating scale help parents and teachers recognize mania in children and adolescents (Alessia, *et al.*, 2002). The CARS-M contains 2 subscales, each of which is scored separately. To derive the mania subscale score, items 1 through 10 are summed. To gauge severity level, the following cut off points is recommended: 0-7 none or questionable mania; 8-15 mild; 16-25 moderate; and 26 or greater indicates severe symptomatology. The second subscale, which measures psychotic symptoms/disorganization, is derived by summing items 11 through 15. Both subscale scores may be totaled to yield a global measure of mania with psychotic features. However, the total score should not be used to measure severity of mania, but rather, only subscale 1 scores (items 1 to 10). The two subscales allow for the independent assessment of manic versus psychotic symptoms, which may respond differently to treatment (Campbell, *et al.*, 2002). It was translated by the researchers and was revised by three experts in the field to take their consent to use it as a clinical tool.

IV- Parent Version of the Young Mania Rating Scale (P-YMRS)

The P-YMRS consists of eleven questions that parents are asked about their child's present state. The original rating scale (Young Mania Rating Scale) was developed to assess severity of symptoms in adults

hospitalized for mania (Young, *et al.*, 1978). It has been revised in an effort to help clinicians such as pediatricians determine when children should be referred for further evaluation by a mental health professional (such as a child psychiatrist), and also to help assess whether a child's symptoms are responding to treatment (Poolsup, *et al.*, 1999). The scale is intended to diagnose BPD in children. This version has been tested in a pediatric research clinic with a high number of children with bipolar disorder (Barbar, *et al.*, 2002). The child's total score is determined by adding up the highest number circled on each question. Scores may range from 0-60. Extremely high scores on the P-YMRS increase the risk of having BPD by a factor of 9, roughly the same increase as having a biological parent with bipolar disorder. Low scores decrease the odds by a factor of ten. Scores in the middle don't change the odds much (Barbar, *et al.*, 2002). The average scores in children studied were approximately 25 for mania (a syndrome found in patients with BPD1), and 20 for hypomania (a syndrome found in patients with BPD2, BPD-NOS, and Cyclothymia). Anything above 13 indicated a potential case of mania or hypomania for the group that was studied, while anything above 21 was a probable case. In situations where the odds of BPD diagnosis are high to begin with (e.g., a child with mood symptoms with 2 parents having bipolar disorder), the P-YMRS can be extremely helpful. But for most groups of people, the base rate of BPD is unknown but low. Then, the most that a high score can do is raising a red flag (similar to having a family history of BPD) (Kaufman, *et al.*, 2001). It was translated by the researchers and was revised by three experts in the field to take their consent to use it as a clinical tool.

Statistical Analysis:

Descriptive statistics such as number of patients, percentages and means were used to describe the study population. For Comparative statistics, we used student t-test to compare means and chi square test to compare percentages. Data were collected, entered into personal computer and analyzed using EPI-Info version 6.04 software (CDC, 2001) and SPSS V.13 software (SPSS, 2002). Statistical significance was set at 5% level ($p \leq 0.05$).

Results:

Out of 120 Attention Deficit Hyperactivity disorder Children, 45 children (37.5%) were re-diagnosed and met the criteria of Bipolar Mood disorder (Table, 1). There were statistical significant difference between BPD group and ADHD group regarding gender, type of school, family history of BPD but no significant difference regarding age, residence and socioeconomic status (Tables, 2; 3). BPD group has statistically significant higher scores (Mean= 36.89 ± 10.59) than ADHD group (Mean= 9.17 ± 2.00), regarding YMRS-Parent Version as shown in table (4). BPD group has statistically significant higher scores (moderate to severe degrees) than ADHD group (normal to mild degrees), regarding CARS-M as reported by parent (Table, 5). ADHD group has statistically significant higher scores (mean= 27.76 ± 12.00) than BPD group (mean= 18.78 ± 4.59), regarding Conner's Rating Scale parent form (Table, 6). BPD group has statistically significant higher scores than ADHD group in sport participation (Table, 7), but not in joining sport club (Tables, 8), according to CBCL. There were statistical significant difference between BPD group and ADHD group regarding social and hobbies, academic performance

and externalizing or internalizing problems (Tables, 9-14). Finally, we put predictors of BPD in children as family history of BPD, disturbances in relationship with parents and siblings, good number of friends,

frequent involvement in social activities, participation in house chores, arithmetic skills, school failure, YMRS-Parent Version score, CARS-M score and Conner's score (Table, 15).

Table (1): Re-diagnosis of ADHD children as BPD.

Children with BPD		Children with ADHD		Total
No	%	No	%	
45	37.5	75	62.5	120

Table (2): Demographic Variables of Both BPD and ADHD Groups.

Demographic Variables	BPD Group N=45		ADHD Group N=75		P Value
	N	%	N	%	
Age (Years) 6-8	13	28.9	23	30.7	0.321
8-10	19	42.2	39	52	
10-12	13	28.9	13	17.3	
Sex Males	26	57.8	49	65.3	0.040*
Females	19	42.2	26	34.7	
Residence Urban	33	73.3	45	60	0.134
Rural	12	26.7	30	40	
School Type Private	12	26.7	9	12	0.048*
Government	32	71.1	61	81.3	
No school	1	2.2	5	6.7	
Socioeconomic Low	15	33.3	33	44	0.246
Middle\High	30	66.7	42	56	

*Statistically significant

Table (3) BPD group and ADHD group on Family history.

Family History	BPD group N=45		ADHD group N=75		P Value
	N	%	N	%	
BPD	23	51.1	7	9.3	0.001*
ADHA	0	0	3	4	
Other psychiatric disorder	3	6.7	5	6.7	
No family history psychiatric disorder	19	42.2	60	79	

*Statistically significant

Table (4): BPD group and ADHD group according to Young (YMRS-Parent Version).

Psychiatric diagnosis	Number	Mean	S.D	P value
BPD	45	36.89	10.59	0.001*
ADHD	75	9.17	2.00	

*Statistically significant

Table (5): BPD group and ADHD group according to (CARS-M) as reported by parents.

CARS-M	BPD group N=45		ADHD group N=75		P value
	N	%	N	%	
Non	0	0	52	69.3	0.001*
Mild	6	13.3	23	30.7	
Moderate	33	73.3	0	0	
Sever	6	13.3	0	0	

*Statistically significant

Table (6): BPD group and ADHD group according to Conner's Rating Scale parent form.

Psychiatric diagnosis	Number	Mean	S.D	P value
BPD	45	18.78	4.59	0.001*
ADHD	75	27.76	12.00	

*Statistically significant

Table (7): BPD group and ADHD group on Sport Practice according to the CBCL.

Sport Practice	BPD group N=45		ADHD group N=75		P Value
	N	%	N	%	
Actual sport practice	N= 45		N=75		0.044*
Participating	17	37.8	17	22.7	
Not participating	28	62.2	58	77.3	
Time spent in sport activity	N=17		N=17		0.001*
Don't know	0	0	4	5.3	
Less than average	4	8.9	11	14.7	
Average	11	24.4	2	2.7	
More than average	2	4.4	0	0	
Degree of skillfulness in sport activity	N=17		N=17		0.001*
Don't Know	0	0	4	5.3	
Less than average	11	24.4	13	17.3	
Average	6	13.3	0	0	
More than average	0	0	0	0	

*Statistically significant

Table (8): BPD group and ADHD group in joining sport club according to CBCL.

Joining club	BPD group N=45		ADHD group N=75		P Value
	N	%	N	%	
Joining	9	20	14	18.7	0.858
Not joining	36	80	61	97	

Table (9): BPD group and ADHD group in Hobbies according to CBCL.

Hobbies	BPD group N=45		ADHD group N=75		P Value
	N	%	N	%	
Yes	19	42.2	19	25.3	0.045*
No	26	57.8	56	74.7	

*Statistically significant

Table (10): BPD group and ADHD group participation in house chores according to CBCL.

Participation in house chores	BPD group (N=45)		ADHD group (N=75)		P Value
	N	%	N	%	
Participating	30	66.7	25	33.3	0.001*
Don't participating	15	33.3	50	66.7	

*Statistically significant

Table (11): Social Competence between BPD group and ADHD group according to CBCL.

Social competence	BPD group (N=45)		ADHD group (N=75)		P Value
	N	%	N	%	
Relation with parents					0.001*
Worse	20	44.4	45	60	
About the same	20	44.4	20	26.7	
Better	5	11.2	10	13.3	
Relation with siblings					0.001*
Worse	16	35.6	38	50.7	
About the same	19	42.2	33	44.0	
Better	10	2.2	4	5.3	

*Statistically significant

Table (12): Social activities in BPD group and ADHD group according to CBCL.

Social activity	BPD group (N=45)		ADHD group (N=75)		P Value
	N	%	N	%	
Number of friends					0.001*
No friend	0	0	24	32	
One friend	5	11.1	39	52	
Two or three friends	11	24.4	11	14.7	
Four friends or more	29	64.5	1	1.3	
Social involvement with friends					0.001*
Less than one time	2	4.4	58	77.3	
One or two times	6	13.4	16	21.4	
Three or more times	37	82.2	1	1.3	

*Statistically significant

Table (13): BPD group and ADHD group in school performance according to CBCL.

School performance	BPD group (N=44)		ADHD group (N=70)		P Value
	N	%	N	%	
School failure	24	54.5	41	58.6	0.535
No School failure	20	45.5	29	41.4	

N.B: 6 children were drops out from school (one child from the BPD group and 5 children from the ADHD group).

Table (14): BPD group and ADHD group on academic performance according to CBCL.

Academic subjects	BPD group (N=44)		ADHD group (N=70)		P Value
	N	%	N	%	
Performance in Arabic subject					0.001*
Failure	8	18.2	37	52.9	
Less than average	12	27.2	27	38.6	
Average	16	36.4	6	8.5	
More than average	8	18.2	0	0	
Performance in Arabic spelling					0.001*
Failure	7	16	42	60	
Less than average	18	41	28	40	
Average	11	25	0	0	
More than average	8	18	0	0	
Performance in Arabic reading					0.001*
Failure	8	18	42	60	
Less than average	20	45.5	28	40	
Average	7	16	0	0	
More than average	9	20.5	0	0	
Difficulty in arithmetic					0.877
Failure	34	77.3	45	64.3	
Less than average	9	20.5	19	27.2	
Average	1	2.2	6	8.5	
More than average	0	0	0	0	

*Statistically significant

N.B: 6 children were drops out from school (one child from the BPD group and 5 children from the ADHD group).

Table (15): Multiple regression analysis for the predictors of BPD in children.

Parameters	Odds ratio	95% Confidence Interval		P value
		Lower	Upper	
1. Age	0.98	0.14	1.12	0.322
2. Sex	0.69	0.26	0.95	0.408
3. Residence	2.20	0.31	2.51	0.138
4. School	0.31	0.26	0.57	0.575
5. Family history	40.60	0.66	41.26	< 0.0001**
6. Sport participation	3.43	0.34	3.77	0.064
7. Joining club	0.03	0.16	0.19	0.857
8. Hobbies	3.71	0.35	4.06	0.054
9. House chores	9.35	0.19	13.10	< 0.001**
10. Relation with siblings	33.70	0.65	34.35	< 0.001**
11. Relation with parents	38.47	0.61	39.08	< 0.001**
12. Number of friend	69.04	1.42	70.46	< 0.001**
13. Social activity	84.93	1.35	86.28	< 0.001**
14. School failure	13.75	0.21	13.96	< 0.001**
15. Arithmetic skill	33.69	0.68	34.37	< 0.001**
16. Conners scale	19.94	5.34	25.28	< 0.001**
17. Cbcl scale	10.2	2.26	2.10	0.075
18. Cars for mania	100.95	11.70	112.65	< 0.001**
19. Ymr scale- parent version	96.59	24.50	121.09	< 0.001**

** Statistical significant at the 0.01 levels.

Discussion

The present study was designed to test the hypothesis that ADHD is a childhood version of BPD in some children and to study the impact of BPD in children on their social competencies, behavioral, and academic performance. It was found that 45 (37.5%) children out of 120 children diagnosed as ADHD were re-diagnosed and met the criteria for BPD. Our result was supported by other studies that found similar rates of BPD in hospitalized children with ADHD (Butler, *et al.*, 2000; Faraone, *et al.*, 2000; Geller, *et al.*, 2002). Testable hypotheses might explain the high rates of incorrect diagnosis of ADHD. Comorbidity is a chance phenomenon and

symptoms of ADHD that precede the onset of BPD represent a pre-pubertal expression of illness antecedent to the development of a full mood episode, that ADHD may be an “age specific manifestation of BPD. The predictive significance of early ADHD symptoms for the ultimate development of BPD is debatable. Some investigators have proposed that ADHD may represent an age-specific manifestation of BPD, while others argue that the two disorders are separate and co morbid, with perhaps one (ADHD) increasing the risk of development of the other (BPD) (Biederman, 1999). Other possibility—that children with ADHD who go on to manifest mania-like symptoms

have "bad" ADHD or a new diagnostic entity altogether—has also been proposed (Jensen, 2005).

Demographic variables of both bipolar and ADHD groups: There was no significant difference between children with BPD and those with ADHD as regard to age. But the distributions of psychiatric disordered children were present more at age 8-10 years, which was found to be consistent with other previous studies (Khashaba, *et al.*, 1997; Szatmari, *et al.*, 1997; El-Batrawy, *et al.*, 2004). Our result could be explained on the assumption that in our culture there is a strong tendency to delay referral of the child to clinics and hope that child will grow out of it. Moreover our culture is more tolerable to children with disturbed behavior than many other cultures. In contrast to our finding some researchers in well designed prospective studies gave the light that bipolar disorder showed three peaks of onset; first from 15 to 19 years, followed by the age range from 20 to 24 years and another peak is the age above 65 years, with a mean age of onset of 18 years (Goodwin and Jamison, 1990; Keck, *et al.*, 2001). The cause of this stratified nature of age of onset is still under work but many hypotheses had been given as over secretion of cortisol, super fast biologic clock located in the suprachiasmatic nucleus or excessive influx of calcium into brain cells which assumed to be preprogrammed (Simon, 2003).

As regard to sex: there was significant difference between children with BPD and those with ADHD disorder which was consistent with the results of previous studies (El-Defrawi, *et al.*, 1995; Szatmari, *et al.*, 1996; Simon, 2003). Reasons for this gender discrepancy remain obscure; however, it could be explained by the

assumption that the disorder is genetically determined with polygenetic inheritance. It is assumed that the females have a higher threshold of phenotypic expression than males (Mubarak and Shamah, 1999). Our result was inconsistent with previous reports that BPD was equally distributed in between both sexes (Keck, *et al.*, 2001).

As regard to residence, there was no significant difference between BPD group and ADHD group as regards residence, this result may be due to the nature of Ismailia area which content rural, semi rural and urban and there is no big difference between different areas. Our results are inconsistent with Okasha, 1988 and El-Akabawy, *et al.*, 1982, who pointed that psychiatric symptoms and disorders are more common in rural Egypt than urban Egypt.

As regard to the type of school: there was significant difference between children with BPD and children with ADHD according to the type of school, but we found the distribution of children with BPD according to the type of school was in private school 12 (26.7%) and government 32 (71.1%), compared to 9 (12%) and 61 (81.3%) respectively in ADHD children. This result can be explained by the low to moderate socioeconomic resources of Ismailia area. In consistent to this result, Farrag *et al.*, (2002), study the relationship between BPD and ADHD and type of the school in Assiut, they found that pupils in national schools had significantly more psychiatric disorders (BPD and ADHD) than those in private school. These results could be related to the selection criteria for admission in private schools, students usually come from higher social classes. In-addition, most private schools had environmental advantages, less

overcrowded classrooms and relatively high quality teachers.

Regarding the family history: We found that positive family history of BPD was reported in 51.9% in BPD children compared to 9.31% in ADHD children. This finding is similar to previous studies that reported that biological especially genetic factors are one of the most important risk factors of BPD in children. Some of this studies tried to find a relation between BPD and specific genetic loci, where certain loci of different chromosomes were found to have a link with BPD as chromosomes X, 5, 11, 12, 13 and 18 (Pollock, *et al.*, 2003; Simon, 2003). In this study there is no significant difference between children with BPD and those with ADHD regarding the family history of ADHA, we found the that there is no children with BPD had a family history of ADHD, and those with ADHD had a family history of ADHD 3 (4%). This finding is consistent with the results of El-Batrawy, *et.al.* (2004), who found no significant difference between children with BPD and those with ADHD regarding the presence of family history of hyperactivity or misconduct behavior. But our result was inconsistent with results of other studies where the authors found that early onset type of BPD was commonly preceded by a family history of ADHD (Sachs, *et al.*, 2000; Spencer, *et al.*, 2002; Weckerly, 2002). This contradiction could be explained by cultural and educational level of parents in our sample and the degree of their orientation to their children symptoms, which may give us a false negative or may be bias in our sample.

Regarding results of Young Mania Rating Scale Parent Version: It is often clinically difficult to differentiate BPD

from other mental health conditions in children especially ADHD (Fristad, *et al.*, 1999; Bowring and Kovacs, 2002; Weller, *et al.*, 2003). Our result showed that there was significant difference between BPD children and ADHD groups regarding to Young Mania Rating Scale Parent Version (YMRS- Parent Version) that was in agreement with Fristad, *et al.*, (2002), who found that YMRS- Parent Version scores were significantly higher in manic versus ADHD children. Also, YMRS is not only useful in differentiating mania from ADHD but also in determining the severity of mania in pre-pubertal children (Poolsup, *et al.*, 2001; Weller, *et al.*, 2003).

Regarding results of Clinical Administered Rating Scale for Mania: It was found that there was significant difference between BPD group and ADHD group in Clinical Administered Rating Scale for Mania (CARS-M) as reported by parents as expected. Geller, *et al.*, (2001), found that the (CARS-M) detected 88% of the children with BPD. Alicia, *et.al.* (2004), reported that Clinical Administered Rating Scale (CARS-M) was more specific to some manic presentations. Our study provided additional evidence of the validity of the (CARS-M) for screening children for BPD. So, our study provided additional evidence of the validity of the (CARS-M) for screening children for BPD.

Regarding results of Conners' Rating Scale: There was significant difference between BPD children and ADHD group regarding Conners' Rating Scale which was consistent with the results of El-Batrawy, *et al.*, (2004), but inconsistent with the results of Fristad, *et al.*, (2001) and Thomas, *et al.*, (2004), who found that scores on hyperactivity rating scales did not differ between the two groups. There are several

mechanisms that could account for these discrepancies between our result and those two studies. In general these two studies use Conners' Rating Scale for teachers and parents so different informants identify different children as problematic; this is may be due to informant variance or instrument variance and sampling variance. On the other hand, differences in rate may stem from differences in the way each informants views the child, for instances, parent may deny the problem that are in fact present in the child perhaps out of a desire to see the child as healthy or normal, alternatively the parent may recognize the child's difficulty but attribute minimal negative consequence to it. Lastly different informants have different levels of exposure to the symptoms of problem behavior. In 6-12 years, the teacher's had direct information about the child performance in this context where as the parent must rely on proxy information from the child and teacher, presumably parents may often lack exposure to a comparison group and thus may fail to recognize that the child behavior is abnormal.

Regarding sport practice: Our results showed that BPD children were significantly participated, spent time and skilled in sport practice compared with ADHD children. This finding was supported by Tillman, *et al.*, (2001), who reported that children with BPD participated more in sport activity as a part from their disorder, (increase activity and increase in intensity in goal-directed activities related to social behavior). Also, Ward and Purvis, (2001), found that BPD child participated in sport more than child with ADHD, because child with ADHD has difficulty in following rules, has a short attention span, often fails to give close attention to details and difficulty in

sustaining attention and while waiting in line, he will frequently kick or push the child next to him, always looking to move on to something new, action before thought. In contrast to our findings, DePauw, *et al.*, (2000), reported that there was no significant difference between children with BPD and ADHD in sport participation. They explained their finding that families of children with BPD and ADHD always aware about precautions need to be taken to ensure safety for the children. These precautions would include the environment (field, court, etc.), equipment, and knowledge of the rules. Our results revealed insignificant difference between children with BPD and children with ADHD in joining sport club. That could be explained by joining sport club controlled by several factors, like social class of the family. In Ismailia community most of the families have low to moderate socioeconomic resources, furthermore, the number of the sport club in Ismailia is few. In addition, there are no much differences between rural and urban areas. Also, most of the families are not interested in joining clubs due to their children disorders.

Regarding hobbies: It was shown that there was significant difference between BPD group and ADHD group in the presence of hobbies. This could be explained by inattention, poor concentration, and abrupt shifts in activity, lack of organization in ADHD children. This result is in agreement of Papolos and Papolos, (2002), and Krasa and Tolbert, (2003).

Regarding participation in house chores: It was found that there was insignificant difference between BPD children and ADHD children. That was inconsistent with the results of EL-Defrawi, *et al.*, (1997),

who found that child with psychiatric disorder do not share their family in house chores, because limitation in the child performance makes the child more dependent on the parents. Our results can be explained that in our study we have 45 female and in our culture the family was always aware about training girls on the housework to prepare girls to be a housewife.

Regarding social relationship: BPD group was significantly more socially competent than ADHD group. A lesser, but still significant, difference was observed between BPD children and ADHD children in relationship with their parents. Our result was supported by the results of Seif-El-Din, *et. al.*, (2001), who found that the relationship with parents getting worse in about 63% of ADHD children and also, with the results of Aziz (2002), who found that 35% of the BPD children had a bad relationship between their parents especially mothers especially during episode of the disorder, and 65% of the BPD children show a good relation with their parents or the same relation after or before the episode. Furthermore, our result agreed with Hans, (2002), who reported that the degree of social functional deterioration among BPD children is not as severe as that seen in ADHD children. This can be explained by the nature of the disorder; the disruptive behavior, moodiness, difficulty sleeping at night, impulsiveness, overactivity and inability to concentrate. All these have been associated with great familial loading (El-Batrawy, *et al.*, 2004). Also, the table showed that the relationship with siblings of the ADHD children was statistically significant worse than BPD children. This result was consistent with the results of Abdel-Gadir, *et.al.*, (2001), who found that (45%) of

children with ADHD had a worse relationship with their siblings. Also, Lewine and his coworkers 2002 found that ADHD children show poor social adjustment, than BPD children. On the other hand, we found that BPD children had also a worse relationship with their siblings. Our findings was supported by Aziz, (2002), who found that 25% of the BPD children had a bad relationship between their siblings especially during episode of the disorder, and 75% of the BPD children show a good relation with their siblings or the same relation after or before the episode. This relationship can be explained on the base that these emotional and social difficulties in both groups and the illness leads to poor self image, decrease self esteem, decrease self confidence, social embarrassment and social restriction.

Regarding social activities: BPD children were more sociable than children with ADHD, as they had significant more number of friends, Also there were more socially involved with their friends within the last 6 months. Our results was supported by Akiskal and his coworkers 2000, who found that these children with early onset BPD had relatively good peer relationships. DeLong and Aldershof, (2000), reported that one-third (33.3%) were noted to possess leadership qualities; 68% of these children with early onset BPD were involved in a variety of extra-curricular activities and were seen by their teachers as making a positive contribution to their social life. This could be explained by the nature of the disorder which makes the child shows increase in goal-directed activity especially in school and excessive involvement in pleasurable activities. A markedly different peer relationship profile was shown in children with ADHD where two thirds of the children with ADHD were

described as having significant poor peer relationship and diminished extracurricular activities (El-Batrawy, *et al.*, 2004).

Regarding school performance: Our results revealed that poor school performance was found in both BPD group and ADHD group without significant difference that could be attributed primary to adjustment problems, the effects of multiple hospitalization and difficulties with peers (Salzman and Salzman, 2000). Also, cognitive deficits associated with BPD cause academic difficulties (Katcher, *et al.*, 1999; Riley, *et al.*, 2001). Additionally, the disorder itself may impede both cognitive and social functioning, leading to decreased academic ability. It is possible to hypothesize that disturbance in frontal lobe and/ or right hemisphere functioning in BPD children may, at least in part, be responsible for this finding (Burder, *et al.*, 2002). As regard, ADHD group, our finding was supported by Biederman, *et al.*, (2002), who found that the frequency of learning disabilities in ADHD ranged from 25% to 45%. Poor academic performance in ADHD could be regard as secondary to impairments of attention and behavior control. In addition, Sliver, *et al.*, (2000), found that academic learning may also be impaired in children who have not developed. In the current study, BPD group showed a higher rate of arithmetic failure than ADHD group, that is consistent with the results of other previous studies that reported specific academic difficulties in children with early onset BPD specially problems in mathematics (Jamison, 2002; Menon, *et al.*, 2002). Arithmetic deficits could be due to underlying deficiencies in a number of cognitive processes, including retrieval of arithmetic facts from semantic memory, execution of arithmetical procedures, or

visuospatial representation (Jamison, 2002). Functional imaging studies have demonstrated that mathematical reasoning involves a distributed network, including the lateral and ventral lateral prefrontal cortex and the posterior parietal lobe, as well as subcortical regions such as the caudate nucleus and cerebellum. Also, Specific deficits in mathematic were correlated with abnormalities in brain structure. For example, mathematics deficits in children with velocardiofacial syndrome have been related to structural abnormalities in the parietal lobe region (Menon, *et al.*, 2002). In the present study it was found that ADHD children showed a higher rate of failure in Arabic reading than BPD children that is supported by Rutter *et al.*, (2001), who reported that student with reading disorder had an elevated rate of hyperactivity and inattention. Generally, we found that both BPD and ADHD children reported less than average level in academic performance this may be due to their illness. There is evidence from a number of studies which suggest that children with psychiatric disorder are underachiever and do more poorly in academically than do their healthy peers. Also, this can be explained by that children with psychiatric illness miss days of school because of acute exacerbation of their conditions, out patient health care related appointment, or hospitalization.

Regarding results of Child Behavior Checklist: We found that there was significant difference between BPD group and ADHD group in Internalizing and Externalizing problems as reported by parents. This result was consistent with the results of Dienes, *et al.*, (2002), who found that children with BPD received elevated scores on the CBCL scales in comparison with non-clinical populations. In addition,

the BPD group differed from the ADHD group only on the aggressive behaviors, withdrawn and anxious/ depressed subscales of the CBCL. Hazell and Lewin, (2000), reported that BPD children may be distinguished from those with ADHD by the internalizing and externalizing symptoms in CBCL. Our results are inconsistent with the results of Chang, *et al.*, (2000), who found no significant difference between BPD children and ADHD in CBCL.

Regarding predictors of bipolar disorder in children: Multiple regression analysis revealed that the CARS for Mania was the most predictor tool for BPD in children than the YMR Scale-Parent Version, Conner Scale or CBCL. This result is consistent with the results of Alessia, *et al.*, (2002), who found that the CARS for Mania is a good tool to use in discriminate between ADHD and BPD. However, Pavuluri, (2002), explained that why the CARS for Mania is a good predictor for BPD. First: CARS is a shorter instrument than CBCL. Second: it is more specific in it's items than the conner's scale. Third: the classification in CARS need only one scale, whereas the CBCL analyses use nine syndrome scale (externalizing and internalizing problems). Also, we found that the frequency of social involvement was a good predictor for BPD in children which was supported by other previous studies (Akiskal, *et al.*, 2000; DeLong and Aldershof, 2000), that could be explained by the nature of the disorder which makes the child shows increase the goal-directed activity and excessive involvement in pleasurable activities.

In Summary, 37.5% of children with ADHD met the criteria of bipolar disorder. A child with bipolar disorder can be

misdiagnosed with ADHD because both BPD and ADHD share symptom characteristics of inattention, behavioral and emotional problems, impulsivity and even hyperactivity. Children with BPD have impairment in their social competencies, and have high level of behavioral difficulties. They also have learning difficulties; hence they are prone to school failure and poor academic performance. We are in agreement with many recent studies (Adler, *et al.*, 2005; Faraone, *et al.*, 2005; Kowatch, *et al.*, 2005; Udal and Groholt, 2006), to conclude that Child BPD severely impairs a child developmental and emotional growth. It is frequently misdiagnosed, resulting in inadequate management that worsening of the disorder. BPD is not often recognized in children and the child reports a long history of related psychopathology misdiagnosed as ADHD. Therefore the first and most important step in treating these children is accurately recognizing the disorder.

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اضطراب المزاج ثنائي القطب بين الأطفال المشخصين باضطراب نقص الانتباه وفرط الحركة

